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AVIS

A MM. les Exposants étrangers de l'Exposition de l'année 1851.

Le Rédacteur du Journal d'Eclairage au Gaz a l'honneur d'annoncer aux inventeurs et propriétaires d'appareils pour la fabrication, distribution, et les emplois à l'usage du gaz, qu'il est pret a se charger de leurs intérêts, pour la grand exposition internationale de l'année prochaine. S'addresser franco au Rédacteur du Journal, 32, Bucklersbury, à Londres.

TO CORRESPONDENTS.

W. B.—*Wigan Cannel is now supplied to the London Gas Works at 22s., and Ramsay's Newcastle Cannel at 20s. or 21s., per ton.*

A New Hand, and others.—*We can take no notice of anonymous communications. All correspondents must give us their names and addresses, not necessarily for publication, but to ensure good faith on their part.*

NOTICE TO AMERICAN READERS.

Complete series of the Journal may be had of Messrs. D. Appleton and Co., 200, Broadway, New York, to whom all subscriptions for the United States, after the 10th of January, 1851, must be paid.

NOTICES.

Subscribers are reminded that all subscriptions for 1851 not paid in the course of the current month, will be charged at the rate of 12s. per annum, payable in two sums of 6s. each, due in June and December of every year.

A few copies of Vol. I. may now be had, price 16s. bound in cloth, or 17s. with the last return made to Parliament by incorporated gas companies. Lettered cloth backs for binding are supplied by the publisher at 2s. 6d. each.

Persons having clean copies of No. 18, Journal and Supplement, to dispose of, may obtain cost price for them on application to the Editor.

All communications and orders for Advertisements to be addressed to the Editor, 32, Bucklersbury, London.

Back numbers exceeding three months' date will in future be charged double price, unless six or more consecutive numbers are taken at the same time. Nos. 6 and 18 are out of print.

The Editor will be particularly obliged by his friends forwarding to him Notices of all Meetings, Trials, or Appeals which it may be interesting to the Gas World to have reported.

Circular to Gas Companies.

The Editor may be consulted on all subjects connected with the supply and manufacture of gas, or the alteration and improvement of gas apparatus, and the construction of new works.

We regret to find that the standing orders of the House of Commons have not been complied with in respect of the proposed bill for the amalgamation of the Chartered, the London, and the Equitable Gas Companies; and that the accomplishment of so desirable a measure is consequently postponed. We have made inquiries in well-informed channels as to the cause of this delay, and learn that the limited time which has elapsed since the project was first seriously entertained, and the period within which the standing orders require that a draft of the proposed bill should be lodged, has not been sufficiently long to allow of a full consideration of all the complicated details of an arrangement, having for its object the fusion of properties, some of them unincumbered, and others more or less burdened, and consequently requiring the mature examination and sanction of the shareholders of the several companies. This state of uncertainty is the more to be regretted, as it leaves them all exposed to the odium which rival interests have endeavoured to heap upon them, without any of the benefits they might have derived from reduced expenses, and increased facilities in the supply of gas. It would, indeed, not create much surprise if they should be forced by their rivals to demonstrate the inaccuracy of the insinuation, that the amalgamation was adverse to the interest of the public, by an early announcement of the reduction in price of Newcastle coal gas, in the western districts occupied by these companies, which was intended, had the proposed measure been carried into effect during the approaching session of Parliament. We have no interest to serve other than that of the public, and are no partisans, either of one side or the other, in the contest which has been commenced in the parish of St. James, and were therefore astonished to learn that one of the advocates of the Western Gas Company had the dishonesty to read at a public meeting a garbled extract from our last circular in support of his assertions that the interests of the consumers were threatened by the amalgamation, whereas had he quoted the entire passage, as he ought to have done, the opposite would appear to have been the tendency of our remarks. Should any further attempt be made to misrepresent us by either party, it will liberate us from the reserve we are desirous of maintaining on this subject; and, as our only wish is to see fair play between them, any renewal of such conduct will compel us to retaliate on the aggressor.

Some samples of the recently-discovered Boghead cannel from Bathgate, a few miles to the west of Edinburgh, have lately arrived in London, and the experiments to which they have been submitted, have so amply borne out the reports we had previously received from Scotland of the properties of this extraordinary product of nature, and of its peculiar adaptation for improving the quality of the gas obtained from inferior coals and cannels, that we have been induced to institute further inquiries, and to collect all the authentic information which has yet transpired on a subject so interesting to the gas manufacturer.

This cannel is found in that group of marine deposits known by geologists as the "carboniferous limestone" of the southern out-crop of the Firth of Forth coal field, and, like the Lesmahago and Newcastle cannels, its value for the manufacture of gas was for many years unappreciated. It is hard but brittle, has an earthy black colour, and breaks with a dull even fracture. It burns with a bright voluminous flame, and gives off

a dense carbonaceous smoke. It is remarkably light, and indeed the lightest specimen of gas coal we have had occasion to examine. Its *specific gravity* is only 1·155, whereas Scotch cannel coal is seldom below 1·25, and generally above 1·3; from which it follows that a cubic foot of this coal will weigh about 71¼ lbs., while the same bulk of ordinary cannel coal will weigh upwards of 80 lbs. In 1849 a specimen was submitted for analysis to Dr. Penny, of the Andersonian University of Glasgow, and his report upon it was so encouraging as to induce the proprietors to take measures for working it upon such an extensive a scale, that they will in a few months be prepared for an out-put of 30,000 tons per annum.

Dr. Penny reported that 100 parts by weight contained:—

Coke	Volatile Matters	71·3	80 lbs.
	Carbon in Coke	11·3	12¼ lbs.
	Ash	16·8	18⅔ lbs.
	Water (expelled at 212 deg.)	·6	⅔ lb.
		100·	112 lbs.

and further, that the amount of sulphur is only $\frac{34}{100}$ per cent.; the total amount of carbon is 51·4 per cent.; and that the quantity of carbon in the volatile matters is 40·1.

It was subsequently analyzed by Dr. Fyfe, with nearly the same results, as this distinguished chemist found each 100 parts to contain:—

Volatile Matter	69		
Coke	31 consisting of	Carbon, 9·25	=30 per cent.
		Ashes, 21·75	=70 ,,
	100	31·0	100

The ashes, according to the same chemist, consisted of 71 per cent. of silica; the remaining 29 per cent. consisting of lime, magnesia, alumina, and a minute quantity of iron, in union with sulphur. The per centage of sulphur amounted to 0·13, equivalent to nearly three pounds in the ton of coal.

The large proportion of volatile matter, and of carbon contained in it, indicated the presence of gas of high illuminating power, and in extraordinary quantities. The average of Dr. Fyfe's trials gave 14,880 feet per ton, of a quality 2 per cent. superior by the photometer test to that of Lesmahago gas. Our correspondent, upon whose authority the classification of the Scotch cannels in our last number was made, calls it 11,500 feet per ton of 38 candle gas, or 26⅓ per cent. superior to Lesmahago (which he calls 30 candles). These results, however, agree *in the quantity of light afforded*, as nearly as laboratory experiments can be expected to accord with the practical working of the retort-house; those by

Dr. Fyfe giving 14,880 feet × 30 6 candles = 455,328.
And the other 11,500 feet × 38·0 candles = 437,000.

Another of our correspondents calls the quantity of gas yielded 12,000 feet per ton, of 38 candle gas, and this would bring its value up to the higher average of Dr. Fyfe.

Dr. Penny's ultimate analyses of some of the cannels operated upon by him in the course of his experiments on the Boghead are embodied in the following table:—

	Sp. gr. of cannel.	Vol. mat.	Car. in Coke.	Ash.	Total.	Sulp. per cent.
Boghead	1·155	71·9	11·3	16·8	100·	·3
Lesmahago	1·240	52·6	41·	6·4	100·	·74
Scotch cannel, average ...	1·330	50·6	41·9	7·5	100·	1·26
Breadisholme	1 319	40·5	51·5	8·	100·	·3
Derbyshire cannel ...	—	47.	48·4	4·6	100·	

Dr. Fyfe's late experiments upon the quantities of gas produced from Newcastle coal (New Pelton and South Peareth) and Boghead cannel, and their relative values, as ascertained by the Bunsen photometer, give the following results:—

Coals.	Cubic Feet of Gas per Ton.	Illuminating Power, 1 Foot= Light of Candles.	Comparative Value of Gases, according to Illuminating Power.	Comparative Value of Coals, according to Illuminating Power and Quantity of Gas afforded.
Best English Caking.....	9,746	2·73	1·00	1·00
Average Boghead	14,880	7·72	2·82	4·30

The value of the Boghead cannel gas, as indicated by the chlorine test, is much higher than the foregoing; but as the doctor truly observes, "that we have not yet acquired the proper method of burning advantageously the gases of very high illuminating power," we are compelled to deal with such tests as speak directly to the senses, and are, therefore, applicable to the present known methods of combustion. Till further improvements have been made in this branch of science, the use of materials so highly charged with carbon as the Boghead cannel is proved to be, must be limited to the admixture with inferior coals and cannels, a practice already adopted in Scotland with the Wemyss, Kirkness, Lesmahago, and other of the superior class of cannels, which, by mixture in small quantities with the Lochgelly,* Skaterig, and other inferior ones, yield a gas of highly illuminating power. On this subject Dr. Fyfe says in his report:—

"Were Boghead coal gas mixed with gas from inferior kinds of Parrot coal, and from English caking coal, it would add greatly to their illuminating power; or, which is the same, were the Boghead coal gas diluted with gas from these inferior coals, while the quantity of gas would be increased, the illuminating power of the Boghead coal gas, as indicated by the photometer, would, most probably, be very little diminished. I conceive, therefore, that the Boghead coal will be of great value to those using inferior kinds of coal in the manufacture of gas,—such as the poorer Scotch cannel coals, and especially the English caking coals."

The discovery of this peculiar class of cannels appears to be destined to benefit to a considerable extent such of the metropolitan gas companies as are preparing for the manufacture of cannel coal gas, by opening to them another source from whence materials may be obtained for the production of gas of high illuminating power, and thereby rendering them less dependent upon the limited sources from whence their supplies are now derived. The impulse which the operations of the Western Gas Company have communicated to the demand for cannel gas, in the western division of the metropolis, has already re-acted upon the Lancashire cannel districts, and exaggerated rumours have got into circulation amongst their mining population, which render the continuance of present prices in some degree uncertain. A mixture of one-third Boghead cannel and two-thirds Newcastle coal, or one-half Lesmahago and one-half Newcastle, will replace the Wigan cannel so far as the quality of the gas yielded is concerned, and the competition thus produced must keep the pretension of each cannel coal district in check, and prevent any combination prejudicial to the public interest. It is with this view that we hail the new discovery with satisfaction, and wish its fortunate owners the success they merit.

While upon the subject of cannel coal gas, we cannot too strongly caution all managers of gas works who are experimenting upon it, either alone or in combination with common coal, not to attempt the combustion of rich gas in burners such as have been used for inferior gases. We have heard of many complaints from gas consumers, that they have of late been supplied, during the last month, with "*smoky gas*," which has blackened their ceilings and been otherwise inconvenient. The burner in general use in the cannel coal districts is Neilson's Union Jet or fish-tail, which, though it requires from $\frac{6}{10}$ to $\frac{7}{10}$ pressure to produce a full-sized flame, will bear a much higher one than any other burner without smoking. An argand of any description, without a regulator for the pressure where it is variable, must produce smoke whenever the pressure exceeds that for which the cock is adjusted, and hence it requires constant watching. Such a contrivance as that patented by Mr. Biddle may possibly overcome the objections which exist to the combustion of rich gas in argand burners, and such inventions are therefore entitled to encouragement.

A valuable contribution in our present number, from the able pen of Mr. Rutter, will be read with much interest by all classes of our readers. Arrangements will immediately be made for its publication, in a separate form, by Mr. J. W. Parker, West Strand, at the lowest price, for local distribution.

A slight advance of from 2s. 6d. to 5s. per ton has been given upon cast-iron goods since our last remarks on the subject. The blow given in Scotland to speculative transactions in what is termed "scrip," or engagements for the delivery of pig iron, has done much to render the trade more healthy, and we are inclined to think that the advance will be maintained during the spring months.

* A correspondent makes the following remarks on the mixture of this cannel with Boghead:—"The Lochgelly cannel coal is admirably adapted for admixture; the light from its gas is of brilliant whiteness, whereas that of the Boghead coal is inclining to a rich cream colour. The two combined afford a pure, powerfully-illuminating, and most agreeable light. Taking the yield of the Lochgelly at 9500 cubic feet, and that of the Boghead at 14,500, and using them half and half, we get a produce of 12,000 cubic feet of gas per ton, giving a most durable light at a considerably reduced cost. But even a larger proportion, say two to one, of Lochgelly cannel coal might be used with great advantage; diminishing thereby the expense of production without much affecting the quality of the gas. The reason for giving the preference to the Lochgelly cannel coal is, that the colour of its gas is the best adapted for mixing with the Boghead, and at the same time its price is the lowest of the Scotch cannel coals."

Communicated Articles.

STREET-LIGHTS,

BY J. O. N. RUTTER, ESQ.

It is not those only who are actually engaged, or otherwise interested, in the manufacture and sale of gas, who ought to be well-informed on all matters relating to the terms of supply, and the prices charged, for that article when used for street-lights. There is another class, both numerous and influential, to whom this subject commends itself, and to whom it requires to be fully explained. The consumers of gas should know, more than they have yet known, how matters stand between gas companies and the public authorities, so that they may judge in what way, and to what extent, their particular interests are affected by existing arrangements. Where old contracts are expiring, and new ones have to be negotiated, it is hoped that parish vestries, town councils, and local commissioners, may not object to have a little additional light let in upon their deliberations; the absence of which has occasioned so much dissension and dissatisfaction.

In the history of gas-lighting there never has been a period so opportune as the present for the discussion of this question. Everything connected with gas is in motion, and is likely to keep moving. Its value is at last beginning to be understood—a value which increases in the same ratio that the price diminishes. Gas-lighting must be greatly extended. Class interests, or local customs, will no longer be permitted to obstruct its progress. Let gas companies, public authorities, and consumers generally, inquire, examine, and judge for themselves. If it can be shown that errors have been committed, let them be corrected. If wrong has been done, although it cannot be repaired, let it not be perpetuated. Amidst the inexperience, or something worse, of by-gone days, if a defective system has grown up, let wiser counsels prevail, and better plans be devised. It is time to have done with official frowns and favouritisms. Away with what are conveniently termed vested rights, exclusive privileges, and established precedents. The right to do wrong has been exercised long enough. Its claims must be disputed, its authority resisted, and its one-sided reasonings exposed. Suspicion is sure to be excited where there are efforts at concealment. The sale of gas need be no more wonderful, or mystical, or difficult, than the sale of bread, or beer, or broad-cloth. Nor is there either mystery, or difficulty, about it when the terms have to be settled with ordinary men of business. Plain dealing, founded on the principles which govern the commonest affairs of every-day life, is all that is requisite. Not so, however, when the same persons, invested with authority, have to buy gas for a public body. Then everything is changed. That which was perfectly intelligible is suddenly involved in hopeless confusion. Arguments which had been admitted as fair and reasonable are pointless and unmeaning; and figures, the accuracy of which had never before been disputed, are discovered to be sadly at variance with known facts. Changes so wonderful and so complete as those I am describing occur periodically. In some places annually, and in others only once in seven, or fourteen, years. It is remarkable that men who so well understand, and so ably illustrate the true principles of trade, in conducting their own business, should, in a few minutes, by the transition from a private to a public capacity, become so oblivious of all they once knew, that they appear never to have been taught even the A B C of buying and selling.

Let us look at the subject a little more closely. To do this, there is no need of going far back into the early days of gas-lighting. The least said about them the better. The unfairness of the charges for gas supplied to public authorities has always been matter of serious complaint. It can be easily proved, and it still exists; the present system being a reflection of the past. Starting on wrong principles, each of the contracting parties were originally equally at fault. Gas companies have evinced as much eagerness in making bad bargains, as public boards have shown an aptitude in binding them to their engagements. Of the past it is useless to complain. That may serve as a beacon which would be dangerous as an example.

The prices obtained for gas supplied to street-lamps have always been too low. Viewed in connection with fair commercial principles, the usages of trade, and the relative obligations of buyers and sellers, they are still very much less than they ought to be. Notwithstanding the reductions which have lately been made in the prices of gas to private consumers, the difference continues too great between the charges made to them and to public bodies. The general body of rate-payers are supplied at too low a price with gas used in lighting the streets; and, as a consequence, the general body of consumers are charged more than they otherwise would have to pay for gas used in lighting their shops and dwellings.

In numerous instances, a fourth part, in others a third, and in some a moiety of the capital of a company has been expended, and is in effect employed, in producing and distributing gas, which yields no profit, and often occasions loss, to the proprietors. It would serve no useful purpose to quote names, or refer to places, in illustration of this. The fact is too well known, and its ill consequences have too long been experienced to require any formal proof. Obstructing the use of gas, because of its high price, these unequal rates of charge have been a fruitful source of discontent; and yet it often happens that those who complain loudest are the very persons who occasion the mischief.

Rejecting extreme cases, which it is always unfair to use in illustration of general principles, I am within safe limits in saying that 2s. 6d., 3s., and 4s., as against 10s., 12s., and 15s., have been the respective prices, per 1000 cubic feet, for gas sold for street-lights and to private consumers. To the latter class, prices have lately been reduced to about half what they were ten or fifteen years since. In some towns the charge for street-lights has been reduced, but not in the same proportion as to private consumers; in others, no material alteration has been made; whilst in some few instances, where sounder views and a more liberal policy prevail, a higher price is paid, and without having caused a murmur of complaint. It may be denied, but it cannot be disproved, that charging gas at a price less than its real commercial value is an act of injustice. Even in towns where the sale of gas is so great that the unequal rate of charge is apparently less oppressive than formerly, it operates according to its proportions as so much dead-weight; which has to be carried by one part of the community, instead of being distributed fairly over the whole.

Is there anything in other branches of trade or manufactures analogous to the customs which have so long prevailed in gas-making? Are large customers supplied with goods at or under cost prices, and small customers charged proportionately higher prices, so as to make an average rate of profit upon the entire transactions? Do tradesmen in general employ a part of their capital, their skill, and their time solely for the accommodation of some of their neighbours, taking the risk of compensating themselves for the loss of profit by one class with extra gains from another? What would be said to bakers, brewers, butchers, and coal-merchants, if they agreed to supply the inmates of hospitals, union-houses, and prisons with bread, and beer, and meat, and coal, of the best qualities, at one-third, or one-half, the current prices, making up the difference by higher charges to all their private customers? This is no fanciful or exaggerated representation. It scarcely comes up to the reality in illustrating the practical working of the system.

Nor must it be supposed that gas companies are only passive observers of these strange doings, and sustain no injury from them. The low rate of charge to one class of their customers, and the necessarily higher rate to the other, gives occasion for continual grumbling. The progress of gas-lighting has never yet been commensurate with the advantages it offers; nor has the success of the companies been as great as they have deserved. Those which have outgrown the ill-effects of antagonism have done so in spite of that, and many other adverse circumstances.

I am aware how frequently, and with what apparent confidence, it is said that companies can afford to supply gas to street-lights at or below cost prices, because their works are larger than would be required for supplying private customers only. To serve a purpose how easy it is to confound things which differ, mixing up truth with error, or changing places with them as the case may seem to demand. If it can be shown that profit and loss really mean the same thing, those who think so had better put it in so many words. We then shall know what to say to them. The profits of gas companies have not been an equivalent for the character and extent of their adventures. Those just referred to, as having risen amidst discouragements, are exceptive cases. Planted in favourable localities, in thickly-populated districts, in the midst of the coal-fields, or amongst the busiest scenes of productive industry, it would have been strange if such establishments had not prospered. Taking these out of the list, it will be found that during the last ten or twenty years the average rate of profit has been less than was promised, less than might have been reasonably expected, and less than it ought to have been; considering the risks and the uncertainties incident to the business, and especially its subjection to parochial and other popular influences. The profits, whatever their amount, have been fairly earned—no thanks to public authorities for a shilling of them. Kindness and co-operation on their part would have helped to increase them; conferring additional benefits on the whole community. This has not been considered good policy. Often has it happened that a contract for supplying gas to street-lights has scarcely been settled, when some of the persons officially concerned in it have made its acknowledged unprofitableness, a ground of complaint against a gas company, for not charging a lower price to private consumers.

The faults have not been all on one side. Gas companies have not shown the tact and judgment which they ought to have done. They have missed many favourable opportunities for setting themselves right with the public, for enlarging their spheres of operation, and for keeping down rivalry. There has been too much fondness for mysticism; too great an indifference to popular opinion; too strong an attachment to official usages and formalities. These are not the sort of tools to work with in the present day—amidst so much that is bustling, and practical, and real.

Many excuses must be made for slow and cautious movements at a time when all were learners. Without some kind and amount of experience, what we call confidence is little better than temerity. It is easy to say what should have been done when we have the benefit of after-knowledge. Still—the difference is perceptible between keeping up with the necessities of the times and lagging

behind them. The instances are remarkably rare in which gas companies can be accused of going, or even looking, too far ahead. During the last year or two they have had both warnings and encouragements. It is hoped they will profit by them.

Thus have I endeavoured to show that the system of charging gas for street-lights, at prices which yield no profits to the manufacturers, is as unjust as it is unsatisfactory; alike injurious to the companies and to their customers. I have abstained from direct reference to particular localities, because I have nothing to do with persons, but with principles. The wrong-doings here complained of must not be charged upon individuals. Personal identity is merged in official responsibility; the acting parties being controlled by customs and usages, following precedents whether good or bad, and assuming that to be legally right which is commercially, if not morally, wrong. If I have lingered over the manifold evils of the street-light system, and said more about them than the occasion seemed to require, let it be set down to my anxiety that the causes of these evils should be understood, where their effects have so long been felt. Those persons who are sufficiently interested in the subject, to have made themselves acquainted with its details, have no need of further instruction. I am not writing for them. There are many who have never thought or heard much about these matters. If anything I have said should be the means of setting them upon the right track, for prosecuting further inquiries, and thus be instrumental in placing the "gas question" a little more distinctly before the gas-consuming public, my object will be attained.

But the duty I have undertaken would be ill-performed if, content with thus endeavouring to expose some of the evils of the street-light system, I made no effort to mitigate or remove them. The following hints and suggestions must be viewed only as supplying materials for thinking and contriving. They are merely outlines—detached portions of which may probably be so brought together, according to the necessities and circumstances of each case, that some change might thereby be effected; that change being always supposed to be in the right direction.

As the first step towards a fair and equitable adjustment of prices for gas, supplied to street-lamps and to private consumers, there should be some general agreement as to what ought to be the relative proportions they should bear to each other. No real good will be done, or progress made, towards a more rational equalization of prices, unless this be taken as the basis on which the discussions, and calculations, and negotiations are conducted. There is no difficulty in this. If the respective parties will act as if they were in earnest, and go about it in a business-like manner, they will be certain of coming to a satisfactory conclusion. A company having gas to sell, which public authorities wish to buy—what can be more natural than first of all to agree upon a price? No dispute can arise upon quality; all classes of customers being necessarily served alike. The quantity required, and the conditions of supply, will, of course, be elements in the proposed contract; but ought not to be mixed up with a plain and intelligible decision upon the charge to be made per 1000 cubic feet for gas.

The plan usually pursued is to fix upon a certain sum per annum for each lamp, professedly varying the charge according to the greater or less number of nights and hours it is required, and the rate of consumption per hour. There would be nothing so very objectionable in this if it were as plain, and simple, and definite as the terms, when quoted to the ear, would seem to imply. It is exactly the reverse of this. Instead of being a ready exponent of the price of gas consumed in street-lamps, as compared with that used in shops and dwellings, it must have been contrived for the express purpose of mystifying and misleading both buyers and sellers; and of furnishing the least possible amount of information to those who ought to know how such bargains are made.

For example:—The charge per lamp per annum is in some places inclusive, in others exclusive, of the costs and repairs of pillars, brackets, lanterns, and fittings. In either case this could be easily understood and allowed for, if we could ensure something like uniformity of practice. Here we are again at fault; the terms, in small towns especially, being almost as various as the places. In addition to the uncertainty as to the amount of constant charges to be defrayed by the companies, we have in some places the lamps in use throughout the year, and only part of the year in others; or, for sake of variety, part lighted during the summer months, and the whole in winter. The periods of lighting and putting out, omissions at full moon, and the use of small burners at some parts of a town, and large ones at others, help further to make the whole affair resemble the changes in bell-ringing, rather than the conditions of a bargain and sale. Encumbered with such perplexing and ever-varying terms, is it any wonder that the sale of gas for street-lights has, in many instances, been like a game of chance? Or, is it difficult to perceive why the chances have been most numerous on one side? If each case stood alone—being decided solely on its merits—properly explained to all the parties interested, and exercising no influence, either by way of precedent or example, beyond the locality, there would not be so much mischief done. But this is not the case. If it happen that a bad bargain be made by one gas company, the price is immediately quoted as ground of complaint against others, all being included in the same category, notwithstanding the endless variations in the terms of supply.

The real purpose of all this has been kept out of public view. The negotiations have begun where they ought to have ended. The first thing to have been agreed upon should have been the price of gas. The authorities wish to buy it—what is it worth? The other items, whether cost of pillars or lanterns, keeping the same in repair, wages to lamplighters, and incidental charges, should not have been mixed up with the first and most important subject of discussion. Need there have been any difficulty or hesitation in quoting a price? The charge to private customers being so well known, the question to be answered was, what abatement is to be made from it in fixing the charge to public authorities? In many kinds of business such a question can be answered in a moment; the charges to wholesale and retail customers being settled by long usage. Here we have a business which is nearly fifty years old, and yet it is without rules for governing prices! In the worst times, before meters came generally into use, there always was a nominal price per 1000 cubic feet to private customers; the basis of the tariffs for time-burners. Now the case is more simplified; time-burning being the exception, and by meter the rule, so that the latter price is a reality to start from. In attempting to uphold the present system, I know how easy it is to talk about the necessities of the case, the public convenience, the privileges conferred upon gas companies,* the importance of keeping down local taxation in general, and the lighting-rates in particular, and hence the special exceptions which must be made in favour of the charge for gas to street-lamps. There is in this nothing but plausible excuses for keeping up a perpetual struggle—*juggle* is the most appropriate word—for the purpose of imposing indirectly a tax upon the few, for the direct relief and advantage of the many. Here I must repeat—fix a price for the gas. Let there be less talking and more doing, and we shall know better what we are about. Begin at the beginning, and everything will be easy, and pleasant, and intelligible.

In most large towns, in the manufacturing districts, the principle I am contending for, as the only right one, is well understood. There, for many years, it has been in operation, and works to the satisfaction and advantage of all parties. It cannot be too quickly, or too widely, adopted in all parts of the kingdom; subject, of course, to such modifications as local circumstances may render necessary. I refer to the sliding-scale of discounts, by which the price of gas, within defined limits, diminishes as the half-yearly or annual consumption increases. Take, as an example of the working of the system, an instance where the price of gas is 6s. per 1000, subject to a gradually-increasing rate of discount according to the quantity consumed, say from 5 to 25 per cent. The effect of this will be that some customers will pay 6s., others 5s. 8½d., 5s. 5d., 4s. 9½d., and 4s. 6d., according to the stipulated equivalents of consumption—the larger the consumption the lower the price. Is not this so rational that it commends itself to every man of business habits? Apply a similar principle to the case under consideration. Take the lowest price at which the largest private consumer purchases gas, by the scale just quoted, and we ought to be getting near to a fair price to be charged to public authorities. If, however, an abatement of 25 per cent. be not considered sufficiently large, let it be 30 or 35 per cent.; the price being always fixed so as to bear some constant relation to that paid by private consumers, and irrespectively of pillars, lanterns, repairs, wages, and other charges, which should be estimated separately.

I am aware, and the frequent inquiries I receive on this subject make me feel it the more strongly, that every case ought, in a certain sense, to stand alone. Local usages, and other circumstances, can never with propriety be dispensed with. Towns, never near to each other, even if they be in the same coal-districts, and supplied with that article on exactly the same terms, have almost always something different in their internal management, in the relative quantities of gas sold, or in the value of coke or other products. Hence the necessity for treating each case separately. Attempting too much in the way of generalization, upon incorrect data, has been a prevailing error.

When a new contract for street-lights is to be made, the common practice has been for the public authorities to collect, by circular or other means, a vast amount of information from various towns at all parts of the kingdom, and, selecting those cases which favour a good bargain, that is, the greatest quantity of gas at the least price—these are pressed upon the consideration of a gas company as examples; other cases having an opposite tendency being withheld. This is unfair. All the conditions should be explicitly stated, their mutual relations explained, and the advantages and disadvantages contrasted and adjusted to a common standard. Both parties

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* That is, in permitting mains and service-pipes to be laid in the streets! This is the old story. It is time it was worn out. To call this a *privilege* is simply ridiculous. All the privilege—as by that I understand something good—has been on the other side. Gas companies have conferred a greater amount of good than they ever have received. Gas-lighting is one of the instrumentalities by which property has been wonderfully improved, cities and towns extended, public convenience and personal comfort and security, beyond all calculation, promoted, and local taxation lightened. Let it be remembered that many towns are indebted to strangers for these advantages; the required capital, and confidence, and enterprise not being at the moment found amongst its own inhabitants.

would then be able to decide their own case upon its real merits. It must be mentioned that, although public authorities are *large* customers to gas companies, unless they pay a fair price, they are not *good* customers—good in this case being synonymous with profitable. Supposing, however, they did pay a price, fairly proportioned to the charge to private consumers, so long as the present system of supplying, that is, distributing, gas to street-lamps continues, they will not be classed amongst the best customers. The waste and leakage consequent upon existing arrangements have an injurious effect upon gas-lighting generally, and that part of it in particular. Admitting in the fullest sense all that can be said about public bodies being large customers, that they pay regularly (?), and that gas companies incur no risks, and no expenses for inspection and collection in that part of their business; still, there are disadvantages which require to be removed, and defects which might easily be remedied.

Consumers by meter bear their own costs of waste and leakage. It is, therefore, their interest to keep fittings in good order and prevent excessive burning. Gas companies bear the cost of waste and leakage in supplying street-lamps. An escape which would not be allowed a day, or an hour, in a shop, or dwelling-house, will go on for years in the fittings or tubing connected with a street-lamp, and without being noticed, much less stopped. If such escapes average only $\frac{1}{8}$th of a cubic foot per hour, that quantity multiplied by the number of hours in a year (8760), and then by half or a third of the lamps (a low estimate), the loss in this way will be considerable. To the leakage must be added, at least, twice, and in many places three times, as much more for waste by irregular burning; the total being in reality a liberal discount on what is considered a net price.

It might probably be said that such matters must be settled by the authorities and the gas companies, the public generally, and consumers of gas especially, having nothing to do with them. Not so exactly. Waste of gas, by whatever means, is in itself an evil, and should, as much as possible, be prevented. I say nothing of its ill-effects physically, that being no part of my present purpose; but its commercial effects are direct, immediate, and constant, and, exactly in the proportions in which it exists, always enhances the price. The losses must be charged somewhere: on what can they be charged but upon that part of the gas which produces revenue? Those persons have some puzzling lessons to learn about the art of gas-making, who know nothing of the disproportions of the quantities produced and actually sold. If the customers could be supplied at the manufactory, and could carry the gas home at their own risk, the process would be both cheapened and simplified. No stronger proof can be adduced of the necessity for preventing waste of gas than the results of the meter system. Meters have had more to do with cheapening gas than any of the so-called improvements in its manufacture. Gas companies have been slow to learn, and the public equally slow to acknowledge, their mutual obligations to this machine. Its merits can never be overrated. As a trustworthy agent between buyer and seller, it is without a rival in the commercial world.

For the defects of the street-light system the meter presents an effectual remedy. It would remove every motive for doubt or misgiving, and every cause for disputes about terms of supply, times of lighting and putting out, sizes of burners, rates of burning, and cleaning lanterns. All these matters, passing directly into the hands of the public authorities, the proper place for them, they (the authorities) would occupy the same position, with respect to the gas companies, as do their other customers. The advantages which, as the natural result of this change, would immediately follow, are so numerous that I have not space here to enumerate them. It may be right to mention, as one in which all parties are interested, that, in most cases, the streets would be better and more economically lighted. The work would have to be done under the directions of the properly-constituted authorities, and the public would then know who were really responsible.

The present system of lighting streets is a long way behind other improvements of the day. The charge for gas being made at per lamp has induced the authorities to have as few as possible, and at great distances apart. Hence arose, and has been perpetuated, the struggle on one side to obtain a large gas-flame as a compensation for distance; and on the other a similar effort to keep to the stipulated limit, and no doubt sometimes within it, as a set-off for the lowness of price. Some people can never understand why a batswing gas-flame, burning 5 cubic feet per hour, should appear smaller on the top of a lamp-pillar than when burning at a level with the eye of the observer. The meter would correct and explain many little matters which it is not easy, and not always convenient, to understand whilst the present system of lighting streets continues.

To the use of meters is fairly due the taste and skill in constructing fittings, and in distributing, arranging, and displaying gas-lights now so conspicuous in shops and public buildings; and which, although less known and appreciated by ordinary observers, has been the means of making way for gas in dwelling-houses with a degree of rapidity which almost exceeds belief. Smaller and more economical burners; smaller, more tasteful, and more durable lamps; a better distribution of light; better arrangements for lighting and putting out; a saving of gas in summer, and using it more judiciously in winter; these, and various other improvements, would be certain to follow the sale for gas to street-lights by meter. Why should it not be fairly tried? Will the general body of rate-payers object? Ask them. Will the consumers of gas object? Trust them. Will the companies object? Why should they? Many thousands of persons who are now supplied by meter, do not consume in a year one-third part of the quantity required during that period for a street-lamp. We should have no more disputes about lighting lamps too late, putting them out too soon, and giving a short supply. Waste and leakage would be reduced, and be no longer a vexed question between the authorities and the companies; and very many other matters which now occasion disagreements and annoyances would never be heard of again.

There is no practical difficulty in making and adapting a meter for supplying street-lamps. These are not days in which to talk about impossibilities. Let it be known that such meters are required,—in other words, create a demand for them in sufficient numbers to reward the manufacturer, and we shall soon see whether the thing be not practicable. Among so many growing, thriving, enterprising towns, which, in this matter, will take the lead and set a good example?

The change I am advocating is not likely to be effected without considerable effort. Public authorities will not be first to move, nor will gas companies. The consumers of gas are most interested in the matter, and they are the proper parties to begin. They constitute a large proportion of the rate-payers, and what they may not be able to do by numbers alone, they will easily accomplish by a right use of their influence. If they neglect their present opportunities the blame will rest on themselves. As a general rule, applicable without distinction as to locality, it might be safely asserted that gas never will be supplied on fair commercial terms, that is, at the lowest possible prices to all classes of consumers, so long as the present system of supplying and charging it for street-lights continues in operation.

If the first attempt should not lead to a full measure of success, take an instalment. A recognition of the principle of charging the gas at per thousand cubic feet will be a gain on the right side. If there be a difficulty about obtaining, for a time, a suitable meter, or if the cost of meters presents an obstacle, the next best thing will be to attach a meter to every tenth or twentieth lamp, obtaining, in that way, something like an approximation to the average rate of supply to the total number.

Where old contracts exist, and no change can be made until they have expired, there should be no concealment about the price charged to public authorities. No good is done by making a mystery of such things—no harm will ensue by giving to them the fullest publicity. It is the easiest, because it is the best, way of answering objections, removing suspicions, and of preserving a good understanding with the public.

The change here contemplated would have the effect of causing a temporary advance in the price of gas for street-lights, but it need not increase the total cost. By better arrangements, and a responsible management, the gas saved would compensate for the extra charge. Extreme cases must be dealt with separately. There are places where about one-half the total quantity of gas produced is sold for street-lights, and without any profit to the company. Ought it to create any surprise that in such towns great dissatisfaction exists that the price of gas is so high? If the companies have to employ half their capital, and do half their work, without any profit, is it not right that the other half should be made to earn an extra proportion? The same principle applies to each case, according to the relative quantities of gas sold for street-lights, and to private consumers, and the prices obtained for each.

It is to be feared that, where things have hitherto worked pleasantly for the rate-payers, however adversely for the gas companies and their private customers, there will be no desire for change; although such a change would eventually be for the good of all parties. In such cases let justice be done. If it can be shown that the gas companies earn, and their customers pay, a part of a lighting-rate, which ought to be distributed amongst the general body of rate-payers; the least that ought to be done is to let those who, for the good of their neighbours, bear these unequal burdens, have the merit and enjoy the praise of doing so. Gas companies are not abstractions; but consist of flesh and blood, and mind and intelligence. The same motives which influence other traders influence them. Why should they not be allowed to conduct their business on the same principles?

Here, for the present, I must have done with street-lights. The subject is not exhausted. On the contrary, my chief difficulty has been to keep within reasonable limits these remarks on the most prominent features of a thoroughly bad system. The views I have expressed are not new. In various ways I have made them public many times before. Here they are applied to details, and put into a popular form. Having no interest to serve but that of truth, I purposely abstain from quoting figures, because in this case they are easily misapplied, and made to speak anything but truth. Wherever honest intentions are combined with earnestness of purpose, the information is always close at hand, by which the foregoing general remarks may be brought to bear upon particular localities.

Black Rock, Brighton, Jan. 1851.

ON THE VALUE OF THE CHLORINE PROCESS FOR ASCERTAINING THE ILLUMINATING POWER OF COAL GAS.

BY ANDREW FYFE, Esq., M.D.,

Professor of Chemistry, King's College University, Aberdeen.

In the advertising columns of the JOURNAL OF GAS LIGHTING for December last the results of trials on the illuminating power of the gases supplied by the Chartered Company and by the Western Company, in London, are given by Mr. Wright, who conducted the trials on behalf of the Western Company. I consider these results as peculiarly important, not as regards the interests of the companies or of the consumers of their gases, but in another point of view. I refer to the much-disputed point—the accuracy of the chlorine test as an indication of the comparative illuminating power of coal gases. This is the method to which I had recourse in testing the quality of the coal gases referred to in my paper published in the first number of the GAS JOURNAL. To this method Mr. Wright objected, because, in addition to the condensation by chlorine, I had also taken into account the durability of the gases, which he said I ought not to have done. Notwithstanding what Mr. Wright advanced in reply to my remarks, I have still the same confidence as before in this method, excepting with very rich gases, in which case it makes the illuminating power beyond that given by the photometer test. I fear, however, that Mr. Wright is not yet convinced of its accuracy, chiefly, I think, because *he has not put it to the test of experiment*. I am glad that Mr. Wright has now given me an opportunity of calling his attention to the accuracy of this method, as *proved experimentally*, by trials conducted by himself, though with a different object in view; and hence their value.

The trials to which I now allude were made on the gases furnished by the Chartered Company and by the Western Company. According to Mr. Wright, in the most favourable instance, the illuminating power of the Chartered gas being taken as 1; that of the Western gas was 2·32. Taking the average of all the trials it was 2·06. To some of these trials, however, objections may be started. Thus, in the sixth of the first series, in which equal lights were obtained, and by which the result was only 80 per cent. in favour of the Western gas, that gas was placed at a disadvantage by the modes of operating. So it was also in the fourth trial of the second series, in which the result was only 59 per cent. in favour of the Western gas. That this inferior illuminating power was occasioned by the small quantity of gas consumed is proved by the result of the first trial of the same series, in which the same method of operating was followed, with the exception of a larger quantity of gas being consumed, and by which the result was 127 per cent. in favour of the Western gas. Leaving out these inferior results, in which justice was not done to the richer gas, and taking those only in which justice was apparently done to both gases, by burning both advantageously, I would say, that, for the consumpt of equal volumes, the illuminating power of the Chartered gas being taken as 1, that of the Western gas is 2·2 on an average of the trials. Let us now see what the illuminating power is by the chlorine test. The gas of the Chartered Company, and on which Mr. Wright operated, was procured, as I understand, from the Peareth and Pelton caking coal. In my paper in the GAS JOURNAL for October, 1849, I have stated that the condensation by chlorine in that gas was 6·5, and that the durability from a jet with an aperture $\frac{1}{3\cdot5}$ of inch, and with a flame of five inches in length, was 50 min. 40 sec. The gas of the Western Company is manufactured from Ramsay's Parrot coal. In my printed report on the qualtity of that coal I have given the condensation by chlorine as 12·5, the durability as 62· min. According to my method of ascertaining the illuminating power, both the condensation by chlorine and the durability are taken into account. Hence

6·5 : 12·5 :: 1 : 1·92, and 50′·40″ : 62′ : : 1·92 : 2·34.

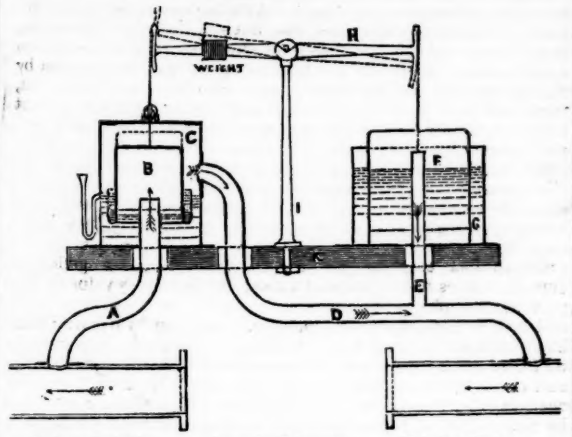
Accordingly, by the chlorine test, by my mode of proceeding, for the consumpt of equal volumes, the illuminating power of the gas of the Chartered Company being taken as 1, that of the Western Company is 2·34; not much beyond the average of the best-conducted trials by Mr. Wright, and certainly in very close approximation to the best of his trials, viz., 2·32; and this last, I maintain, is what ought to be taken, because what is got by one trial ought to be got by others, if properly conducted.

I trust that this will satisfy Mr. Wright that the chlorine test is equally accurate with the photometer test; excepting, as I allow, for richer gases, by the consumpt of which we do not get by the present mode of combustion the light that we ought to get, were those gases properly consumed.

DESCRIPTION OF AN IMPROVED EXHAUSTER COMPENSATOR,

By Mr. WILLIAM HALL, Vaise, near Lyons.

This apparatus was adapted by the inventor for the purpose of preventing the formation of a vacuum in the inlet pipes of a large exhauster which he has recently erected for the drawing off of 900 cubic feet of gas (principally carbonic oxide) per minute from the two furnaces of a chemical work; and as its action is effective, and its construction simple and economical, it may be advantageously applied to the exhausters in use in gas works.



Main to Gasholder. Space for Exhauster. Main from Retorts.

A, a pipe leading from the main between the exhauster and the gasholder, passing through the water in the cylinder, C, and under the bell, B.

B, an inverted cylinder of sheet iron, closed at the top and loaded with lead at the bottom, suspended by a small wire passing through the top of the cylinder, C, and suspended by a chain to the lever, H.

C, a cylinder closed at both ends and fixed to the shelf, K.

D, a pipe leading from the cylinder, C, to the mains beyond the exhauster.

E, a small pipe leading from pipe, D, through the water in G, under the bell, F.

F, a bell in sheet iron, open at the bottom, and suspended by a chain to the arched end of the lever, H.

G, a cylinder fixed to the shelf, K, open at the top, and nearly filled with water.

H, I, and K, lever support and shelf, on which is suspended and fastened the machine.

The action of the compensator is as follows:—Let us suppose the exhauster running at a greater speed than is required to draw all the gas formed in the retorts, there will be a partial vacuum formed in the various pipes between the exhauster and the retorts, and of course under the bell, F, which will descend from the pressure of the atmosphere, and raise the bell, B, above the surface of the water in C, the gas from the main, between the exhauster and the gasholder, will flow up the pipe, A, into the cylinder, C, pass by the pipe, D, beyond the exhauster into the main, and from thence into the exhauster, and restore the balance. If the demand and supply be equal the apparatus will not act; but as soon as the supply is diminished the machine will act. The machine may be so adapted as to regulate the throttle valve of the steam-engine in case the product of gas was more than the exhauster drew off. A small bent pipe with a funnel-shaped end is attached to the cistern, C, to supply the waste of water from evaporation or loss. A sliding weight may be placed on the lever to regulate the action of the machine. The action of the machine is insured, not only by the air on the bell, F, but by the reduced pressure on the bell, B, and the pressure under the same (B).

DESCRIPTION OF AN AMMONIA-METER.

BY J. J. GRIFFIN, F.C.S.

In a communication to the Chemical Society, about four years ago, Mr. Griffin gave an account of some experiments, tending to prove that mixtures of liquid ammonia with water possess a specific gravity which is the mean of the specific gravities of their components; that in all solutions of ammonia a quantity of anhydrous ammonia weighing 212½ grains, which he calls a *test-atom*, displaces 300 grains of water, and reduces the specific gravity of the solution to the extent of ·00125; and finally, that the strongest solution of ammonia which it is possible to prepare at the temperature of 62° Fahr. contains, in an imperial gallon of solution, 100 test-atoms of ammonia.

The form of the instrument devised by Mr. Griffin is that of an ordinary glass hydrometer, with a paper scale, showing 100 degrees. Every degree indicates one test-atom, or 212½ grains of anhydrous solution in the gallon of solution. The zero of the scale signifies pure water at the temperature of 62° Fahr. The first degree signifies one test-atom of ammonia, and the hundredth degree 100 test-atoms. The specific gravity of the liquor, which corresponds with 100° of strength, is ·875, water being taken at 1·000.

In order to render the indications afforded by this instrument useful to manufacturers, Mr. Griffin has prepared a table, which

shows the constitution of the 100 solutions of ammonia corresponding with the 100° of the instrument. This table gives the specific gravity of the solutions; the weight of an imperial gallon in avoirdupois, pounds and ounces; the per centage of ammonia by weight; the degree of the solution as indicated by the instrument, corresponding with the number of test-atoms of ammonia present in a gallon of the liquor; the number of grains of ammonia contained in a gallon; and lastly, the atomic volume of the solution, or that measure of it which contains one test-atom of ammonia.

The ammonia-meter and the table together will enable a manufacturer to determine not only the actual strength of any given liquor, but the precise amount of dilution necessary to convert it into a liquor of any other desired strength; and the direct quotation of the number of grains of ammonia contained in a gallon of solution enables one to judge at a glance at the money value of any given quantity of ammonia.

Although there can be no doubt that the best hydrometer that can be made stands in point of accuracy far behind the chemical process of centigrade testing, yet the utility of the ammonia-meter to the manufacturer and to the consumer of ammonia will be very great; and much credit is due to Mr. Griffin for the construction of so good an instrument, and for the elaborate table which accompanies it.

CHEMICAL EXAMINATION OF THE REFUSE LIME OF GAS WORKS.*

BY M. MALEFANT.

The product which, at the time of my researches on this subject, offered the greatest interest, was the hydro-sulphocyanide of lime, which is present in large quantity; this I have obtained by the two following methods:—

1. I triturate the refuse lime, in a mortar, with a sufficient quantity of distilled water; I allow the mixture to remain in a glass for twelve hours, shaking it from time to time; then, after giving it some little time to settle, I filter off the liquid, which is as limpid as water. This liquid contains caustic lime and hydrosulphocyanide of lime in solution. To get rid of the excess of lime I pass a current of washed carbonic acid gas through the liquid. As the quantity of CO^2 cannot be exactly determined, to precipitate the lime, one of the following cases presents itself, if the neutralization be not attended to,—either there remains some caustic lime or bicarbonate of lime in solution. On this account I pass an excess of carbonic acid through the liquor, at the risk of having a bicarbonate of lime in solution, which I readily precipitate by means of alcohol, of 95° Centigrade. At the expiration of a few hours the bicarbonate of lime precipitates; I filter, and the liquor contains hydro-sulphocyanide of lime, which I dry under a bell glass with lime.

2. I have also obtained the sulphocyanide of calcium by the following means:—I powder the lime in a mortar and treat it direct with alcohol at 95° Centigrade. After three days' maceration, agitating the mixture from time to time, I filter off the supernatent alcaholic liquor from the calcareous deposit, and evaporate it to dryness under a bell glass, as in the preceding case. The oleo-bituminous residue is then acted upon by distilled water, which dissolves only the sulphocyanide of calcium; this I pass through a previously washed filter, and again place under a bell glass with lime. Both of these methods were perfectly successful.

GAS LIGHTING IN GERMANY.

HAMBURG.

Hamburg was one of the last great European cities, susceptible of being economically lighted with coal gas, which availed itself of the advantages of the new light. Its steady-going though somewhat stand-still Senate was, after 25 years' solicitation by numerous competitors, prevailed upon in the year 1844 to give a trial to a system which there was no longer any pretext for refusing to adopt, nor have the sturdy burghers much cause to regret the delay, seeing the advantageous terms they were at length enabled to make, by a contract which, at the expiration of 30 years, leaves them in possession of an establishment *free of cost*, and, in the mean time, secures to them a supply of gas at a moderate charge. We trust its spirited proprietors will find a sufficient remuneration for the large outlay incurred, and the onerous obligations contracted, the nature of which are clearly set forth in the following translation of the conditions upon which the concession has been granted; many of them should, however, serve rather as warnings to the incautious speculator, than models to be followed by gas companies in entering upon similar contracts.

The measures and values quoted are those current in Hamburg, and bear the following proportions to those of England:—

Measures.

Cubic Feet English.				Cubic Feet Hamburg.
1000	..	equal	..	1216·7
829·8	..	„	..	1000.

Value.

16 schillings	.. equal	..	1 mark current.
1 mark current	„	..	14½d. English.
16 „ 12 sch.	„ to £1 sterling.		

CONTRACT

made the 28th of March, 1844, between the Exchequer Authorities of Hamburg and Mr. James Godfrey Booth, on the part of the Hamburg Gas Company:—

Art. 1. The Gas Company undertakes the lighting of the city and suburbs thereof, in their present or future extent, by means of coal gas, the pipes being laid down in the streets, public places, and alleys, and generally in all places wherein the lighting of the streets has been hitherto provided by the state. The said contractors are likewise bound to furnish gas to every public building, and to every private individual when desired, as soon as pipes for the public lighting shall be laid down in the streets or the places to which the dwelling or premises of such private persons shall adjoin.

Art. 2. The Hammerbrook and the Grune-deich, from the point where the railway intersects it, remain for the present excepted from the obligation as to public lighting by means of gas; but the Stadt-deich, as far as the Brandshofer Sluice and the Grune-deich, from thence to the railway, must be lighted forthwith.

But, as the company is authorized to extend the laying down of their pipes to this excepted district, so the Exchequer authorities have the right to require for this excepted district, and for every district which may be added to the city or suburbs, an extension of gas lighting when the district may have been lighted by means of oil, or even indeed may not have been lighted by the state, so soon as it can be shown that, at the time when the demand is made, the public lighting and the private lighting in such districts will yield six per cent. interest on the cost of such new works, which cost comprises the value of the pipes to be laid down, the public lamps to be fixed, and the digging out and filling in of the soil, without reckoning the value of the gas, and any increased cost thereby for the conducting of the business of the company.

For the districts without the city and the suburbs, such an extension can only be required when, instead of six, ten per cent. on the cost of the work can be shown and guaranteed. An extension of the gas lighting beyond the Hamburg territory can never take place, unless with the express approval of the Exchequer authorities, and with the consent of the Senate.

Art. 3. The approbation of the Exchequer authorities is required for substituting any other materials than coal for the making of gas.

Art. 4. The whole of the pipes to be laid down in the streets, alleys, and public places, must be of cast iron; and the service-pipes for each street lamp and buildings of wrought iron. No other material but iron pipes, or, in the houses, copper or brass pipes, can be used for the transmission of gas. The whole of the cast-iron pipes must be tarred inside and outside, and the wrought-iron secured against rust on their being laid down; and the soundness of the pipes must be first proved in the manufactory where they are made. A second trial of their soundness will be made, after the arrival of the pipes in Hamburg, by means of gas or air, with a pressure of not less than 2½ atmospheres. The Exchequer authorities may, so often as they may deem fit, direct their agents, experienced in such matters, to be present at such proof. These experienced persons shall have the right to cause pipes of the several dimensions to be proved in their presence, or to prove the same themselves.

Art. 5. As the works are to be so arranged as to correspond, not only with the supposed present demand, but also fully to satisfy a future larger demand, so the dimensions of the pipes shall be fixed relatively to these two purposes. One hundred and sixty-six thousand feet of pipe are to be laid on the part of the company, commencing with 18 inches English in bore, down to 3 inches English; and such pipes are considered as complying with this intention. Though the additional pipes may be of smaller diameter, the above-mentioned intention must be kept in view.

Art. 6. All works constructed on public land are to be carried on according to a plan to be laid before the Bau Deputation, and are to be approved of by them, so that the traffic shall suffer as little as possible, though the execution of the same should thereby increase the cost; and these works shall be so done that all danger and injuries for the public shall be avoided.

When pipes have to be laid through private property, it is the business of the company to obtain the consent of the proprietor. In cases of hinderance, the authorities will willingly interfere as mediators. Should passages leading through private property, or places, be lighted by the state, but through which the proprietor refuses to allow pipes to be laid, the Exchequer authorities will not insist on the gas lighting of such passages or places.

Art. 7. Within two years from the date hereof, at least 120,000 feet of main pipes must be laid down, of which 70,000 feet of main pipes must be so laid within a year from the date hereof, and the public lighting on this line must be in operation; 50,000 feet additional must be laid down and be in operation in the second year. Within five years from the date hereof, the gas lighting, in its whole extent, must be in operation. The company, however, are at

* Society for the Encouragement of Arts, Commerce, and Agriculture, Paris.

liberty to lay down in the two first years more pipes than are prescribed, and to put the lighting into operation, and also to complete the whole lighting by gas in a shorter space of time than five years.

Art. 8. For the laying down and keeping in order of the pipes for public and private lighting, the requisite breaking up and relaying of the stone, asphalt, or other paving or pavement, and the works and reparations to all bridges, embankments, sewers, water-pipes, and other state property, or other construction in the streets, canals, and public places, shall be at the cost of the company, and be done under the control of the Bau Deputation. The company shall forthwith repair every defect in the paving or pavement replaced, on being so required.

When public works, such as the reconstruction of bridges, or their repair, the alteration, repair, or rebuilding of streets, or whatever other public work shall require the removal of the gas pipes, or measures for their security, or the removal of particular lamps, the company are bound to effect the same at their cost.

Art. 9. All damage done to the works, or any part thereof—be it out of malice, or by the carelessness of individuals, or by war, or the operations of nature—must, like every other private undertaking, be borne by the company. Damage caused to the company from tumult or riot shall, however, eventually, in case no compensation for damage is to be obtained from the rioters, be paid out of the state funds.

The works shall have the same protection which is granted to private or state property, and such as has been hitherto granted to the public lighting. All damage done to the works shall be inquired into by the police, when it shall be necessary, and punished; and in the proclamation on the part of the police, published at the commencement of the gas lighting, the works shall be recommended to the particular care of the public.

The company are entitled daily to inspect the register delivered in to the Bau Deputation, concerning the work done in the streets and public places; and a notice shall be given them when public work is to be undertaken in places where any gas pipes are laid.

Art. 10. The gas works, and any gasometers, as also the whole undertaking, shall be under the inspection of the proper competent authorities, and be subject to their disposition in respect to the risk from fire, and the public safety, and in respect to the supreme authority and the building police. All explanations required by the authorities are to be given at once.

The company shall be bound to adopt all inventions for the diminution or removal of nuisances caused by smoke, which may be found practically useful. No dirty or foul water, produced in the making of gas, shall be turned into the rivers, canals, ditches, or other private or public water, nor be let into the neighbouring property in any manner whatever; and, to avoid nuisances, the small street syphons, laid under or in connection with the gas pipes, shall be emptied as often as necessary, before the commencement of the public traffic.

The preparations and arrangements which the company intend to make, to comply with these directions, must be communicated to the said Exchequer authorities. Any sewers and other works permitted by the authorities to the company, or prescribed by the public interest, must be executed and kept up at their own cost. All buildings and other works requisite for the making of gas and supplying the same, as also all lamp-posts and branch pipes, where allowed, with all the requisites for the public lighting, must not only be provided by the company, but also always be kept, until the expiration of the contract, in a complete state, and, when required, be replaced in the same state, and delivered up in such condition at the termination of the contract.

Art. 11. The distance between each public lamp is fixed on the average at 90 Hamburg feet. The company, however, undertake in the first instance to place, at their own cost, a row of lamps, so to ascertain practically the proper distance. The Exchequer authorities, notwithstanding, are at liberty at any time to require greater proximity to, or a greater distance from, each other, on payment of the cost of removal. The lamp-posts must be of cast iron, and of the pattern to be chosen by the Exchequer authorities, who are at liberty to require lamps in certain places to be attached to houses, and may also require, for the lighting of public places, lamps and lamp-posts of larger dimensions than street lamps, and also of a consumption of gas corresponding with the size of the same.

The burners of the public lamps shall be of the batwing form. Should, however, any other form present itself hereafter more advantageous for the lighting, the company is willing to introduce the same, if desired.

Art. 12. The time of the burning of the lamps destined for the public lighting is to be regulated by the "Lighting Calendar" for the year 1843. The Exchequer authorities are at liberty to make alterations in these regulations, and to direct a shorter or a longer time for the burning.

Every lamp destined for the street lighting shall consume five Hamburg (4·15 English) cubic feet of gas per hour until midnight, and 2½ Hamburg (2·075 English) cubic feet of gas per hour after midnight; but it is reserved whether this diminution shall not only take place with the larger lamps destined for lighting places, but also whether for alleys and smaller streets an illuminating power of 2½ cubic feet shall not be deemed suitable by the Exchequer authorities for the whole time of burning in the night.

Should the Exchequer authorities at any time prefer to allow the full illuminating power to continue after midnight, or to make any other arrangements as to the quantity of gas to be consumed by the street burners, or a division of the same, during the time of burning in the night, or to direct the burning with half power in moonlight nights, they are at liberty to do so.

The company is bound during fires to give the increased light after midnight, if required.

Art. 13. The Exchequer authorities agree to the offer of the company to supply the public and private lights with coal gas purified by the invention of the company's engineer, Mr. James Malam, by two processes other than by lime.

The company bind themselves that this gas shall not only far exceed the gas produced from Newcastle coals for the public lighting, but also shall almost entirely remove the evils of the sulphurous and watery contents, as also the smell from the burning of the soot and vapour in confined places, as also every danger of the freezing of the pipes. As the said engineer declares that, in consequence of his presence in Hamburg, he is prevented from taking further steps to obtain a patent in Great Britain for his invention, for which patent he has already applied, his process for preparing and purifying gas, as laid before the Commissioners of the Senate and the Exchequer authorities, prepared in a statement to the satisfaction of Professor Wiebel, and signed by the authorized agent of the company, Mr. James Godfrey Booth, the engineer, Mr. James Malam, and Professor Wiebel (by the last named as a proof of the sufficient description for the control), shall be sealed up and be annexed to this contract as part of the same.

The Exchequer authorities are authorized not only to require the making of the proper arrangements for the said process being acted upon before the commencement of the lighting, but also for the most conscientious and satisfactory carrying on of the same after the gas lighting is in operation, and during the continuance of the contract; and they may allow the same to be controlled, at any time they may choose, by competent persons to be named by them.

The said purifying process must not have any effect on the gas injurious or prejudicial to health; but, should such be the case, the method having such an effect is to be done away with, and all the other conditions of the contract as to the illuminating power shall remain, nevertheless, in force.

Should a more complete method for preparing and purifying coal gas than that here stipulated for, be discovered during the continuance of the contract, and the application of it on a large scale for street lighting be approved and practised, the company are bound to apply this method for the gas lighting here.

Art. 14. The illuminating power to which the company bind themselves is fixed as follows:—"The light of 12 wax candles of the best quality, of which 6 are equal to 27 half-ounces of the market weight of this place, and 13 inches in length, shall give a light equal to 5 Hamburg cubic feet of gas; and the light of 5 such wax lights for 2½ Hamburg cubic feet of gas."

Should the company not be able to give the strength of 5 wax lights, by means of 2½ cubic feet of gas, for the public lamps after midnight, they are bound to deliver so much more gas as is requisite to produce the power, without being paid for more than 2½ (Hamburg) cubic feet per hour.

A similar obligation to make good the defective illuminating power by increased expenditure of gas, without increased payment, is imposed when, by means of 5 Hamburg cubic feet of gas, the illuminating power of 12 wax lights cannot be obtained.

On the contrary, the company is not to be allowed to reduce the said quantity of 5 cubic feet of gas in case a greater illuminating power than that stipulated for being obtained; as it is the true and sincere intent of the company that the utmost purity and illuminating power of the gas that can be obtained shall be really produced by the specified purifying process, or by any future better one (Art. 13, end). The penalties mentioned in Arts. 16 and 17 shall not, however, be inflicted unless the illuminating power of 5 Hamburg cubic feet shall be below 10 wax candles.

Should, however, experience show that the purifying process produces an illuminating power of 12 wax candles and above, the illuminating power of 12 wax candles shall be the standard intensity for the fixing of the penalty; and everywhere, when in the following paragraphs ten wax candles are mentioned, this number shall be substituted, and, at the proper time, become part of this contract.

Art. 15. For the continual control of the illuminating power there shall be put up in one or more public buildings,—

1st, A street burner, consuming five Hamburg cubic feet per hour; and, in case an increase of the quantity of gas should be requisite according to the standard of Art. 14, a second burner, consuming this increased quantity per hour; and,

2nd, At a distance, to be fixed on photometrical principles by persons experienced in the matter, appointed by both parties, one, and eventually two candlesticks, each for a wax light of the best quality, 6 of about 27 half ounces at the market weight and 13 inches long; as also, on,

3rd, The same principles, a controlling arrangement for a burner of 2½ cubic feet per hour, to be used on the Rumford method, to determine, by comparison of the shadow, the intensity of the light.

In these experiments the employment of reflectors, or glass cylinders, is inadmissible.

For controlling, on the other hand, as to the stipulated quantity of gas, the Exchequer authorities are at liberty to adopt that trial-system which affords the greatest degree of exactness, and they may let this trial take place before the burner as well as before the gasometer.

A control of the gas works by the gas inspectors of public buildings and charitable institutions, as also that of private persons in case the Exchequer authorities should desire it, is not disallowed.

A trial of the quantity before the burner, and a comparison of the burner with the standard lamp in regard to their illuminating power, also in the above-mentioned manner, shall take place in not less than eight streets which do not adjoin each other, and either distant from or near to the gas work, as often as may be deemed requisite to render effectual the conditions of Arts. 16 and 17.

The mean of the collective experiments shall decide as to the quantity and illuminating power. The trial of the illuminating power shall be taken on the broad side of the flame.

Should a deficient quality not be made out or established by notice to, or by the presence of, the engineer or one of the officers of the company, or the deficiency not be acknowledged at once by the agent of the company, the arbitration described in Art. 30 shall take place. The Exchequer authorities are at liberty to name one person skilled in the matter, and also from the beginning to have recourse to this proceeding by arbitration. All the arrangements necessary for exercising the control must be made at the cost of the company.

Art. 16. Should the quantity of gas supplied, or the illuminating power, or both, prove to be less than is stipulated for, then, in addition to the diminished payment to the amount of the deficiency, the following penalties shall be incurred, so soon as the difference amounts to 8 per cent. or more:—

a. If the diminished illuminating power, or the quantity of gas, amount to 8 per cent. less than that stipulated for, the penalty is 20 mks. currency daily.

b. If above 8, up to 16 per cent., the penalty is 40 marks currency daily.

c. If it amounts to above 16, up to 24 per cent., the penalty is 80 marks currency daily, and so on. This penalty shall continue till the normal or standard illuminating power and quantity are again attained.

The company can only be freed from the penalty, but not from the obligation to produce the illuminating power, by sufficient proofs to the Exchequer authorities that the deficiency had temporarily taken place without their fault, and from unavoidable circumstances. (*To be continued.*)

Correspondence.

RULE FOR ASCERTAINING THE PRESSURE OF GAS HOLDERS OF DIFFERENT DIMENSIONS.

Sir,—In the erection of gas machinery it is frequently requisite to ascertain the pressure of gas which will be given by a gas holder of a certain diameter and weight, and as the following rule may, perhaps, be much more simple than those generally used for the purpose, I beg to forward it to you for insertion in your widely-circulated Journal, if you think it likely to be useful to any of your readers.

Rule.

Multiply the weight of the gas holder in tons by 547, and divide by the square of the diameter in feet, the quotient will be the pressure required in inches of water.

Example.

Required the pressure given by a gas holder 40 feet diameter weighing 9 tons.

547
9

40 × 40 = 1600) 4923 (3.08 inches nearly
4800

12300
12800

Demonstration of the Rule.

Let w = weight in tons.
d = diameter in feet.
p = pressure in inches.

Then the rule expressed algebraically is $p = \frac{547\ w}{d^2}$. It is known from the laws of hydrostatics that the quantity of water displaced by any floating body is equal in weight to that body. And therefore since the pressure given to the gas is equal to the difference between the height of the water inside and outside the gas holder, the question becomes simply to find the height of a cylindrical column of water whose area is equal to the area of the gas holder and weight in tons = w.

Now one ton of water contains about 35.84 cubic feet, and therefore 35.84 w = number of cubic feet in the column, and this divided by the area—or $\frac{35.84\ w}{\text{area}}$ will give the height required, in *feet*. But since it is wanted in *inches*, we must multiply this expression by 12, giving the height in inches (or p) = $12\ \frac{35.84\ w}{\text{area}}$, or very nearly = $\frac{430\ w}{\text{area}}$.

Then substituting for the area of the cylindrical column its known value in terms of the diameter = $\frac{1}{4}\ \pi\ d^2$ (π being the circumference of a circle whose diameter is unity) it will become $\frac{430\ w}{\frac{1}{4}\ \pi\ d^2}$, or, which is the same thing, $\frac{1720\ w.}{\pi\ d^2}$

And, lastly, putting in the place of π its approximate numeral value, we obtain $p = \frac{1720\ w}{3.14159,\ \&c.\ d^2}$, or, dividing the upper coefficient by the lower, = $\frac{547\ w}{d^2}$, which is the same as the rule.

Q. E. D.

The rule given above may be varied conversely in the following manner:—

1st. Given the diameter and the pressure to find the weight requisite; then $w = \frac{p\ d^2}{547}$, or, multiply the square of the diameter by the pressure, and divide by 547, the quotient is the weight in tons.

2nd. Given the pressure and the weight to find the diameter, then $d = \sqrt{\frac{547\ w}{p}}$, or, multiply the weight by 547, and divide by the pressure, the square root of the quotient will be the required diameter.

Note.—The levity of the gas in the gas holder is not taken into account in this rule. Neither is the weight lost by the dipping of the sides of the gas holder into the water. These two causes will reduce the pressure in a very small degree, both varying according to the height the gas holder stands above the water in the tank; and the latter being dependent likewise upon the weight of the *sides*. They are generally neglected in practice, but should they be required, the following formula will give the corrections.

1st. Divide the height in feet that the gas holder stands above the water by 128; this will give the diminution of pressure in inches, caused by the ascending power of the gas when the gas holder is at that height.

2nd. Supposing the same height still preserved, multiply the *depth below* the surface of the water in feet—by the weight of the *sides of the gas holder in tons*, and again by 71½ for a dividend, and multiply the square of the diameter by the *whole depth* of the gas holder for a divisor. The quotient will give the diminution of pressure caused by the loss of weight of the iron in the water.

If these two amounts be added together and their sum subtracted from the pressure as originally found, it will give the corrected pressure at that height.

Thus, suppose in the former example the weight of the *sides* to be four tons, and the whole depth of the gas holder 20 feet, it is required to find what diminution of pressure will take place when half full, or 10 feet above the water.

Then the first correction is—

128) 10.00 (.08 inches nearly.
1024

And the second—

10 feet below the water.
4 tons = weight of sides

40 × 40 = 1600 feet deep 20 — 40 — 71.5

32000) 2860.00 (.09 inches nearly.
288000

and 3.08 pressure originally found
minus .17 = .08 + .09 corrections

2.91 pressure when half full.

It would be easy to give a demonstration of these rules, but as they are of so little consequence, to do so would perhaps be only needlessly occupying your pages. They are expressed thus symbolically:—

Let H be the whole height in feet,
h be the height above the water,
s be the weight of sides in tons,
and C c be the corrections required in inches.

Then the first rule is C = $\frac{h}{128}$ the second $c = \frac{71.5\ s\ (\text{H} - h)}{\text{H}\ d^2}$ and the corrected pressure = p—C—c.

I subjoin an adaptation of the formula for that invaluble calculating instrument—the sliding rule—in the form given by Bevan.

A	Weight in tons.
B	Pressure in inches.
C	547.
D	Diameter in feet.

William Pole.

HOW PETITIONS ARE MANUFACTURED.

SIR,—I was this morning seated at my desk, making out one of my longest Christmas bills, when I was waited upon by a person on behalf of the Great Central Gas Consumers' Company, soliciting my signature to a petition, to which he presumed I would willingly affix my name, as I had signed that to the Court of Sewers for the admission of that company into the city of London, and the petition to Parliament for its incorporation was a necessary consequence of the other. My hair stood on end when I heard that my signature appeared to any petition in favour of such an uncalled-for nuisance, as it is well known to my friends and neighbours that I have uniformly opposed it, and pointed out the inconveniences and loss the public would inevitably sustain through its introduction, and which have been so fearfully realized. I therefore ventured to hint that there must be some mistake. He, however, referred to his canvassing-book, and there pointed out my name inscribed as a consumer of gas, and signer of the petition to the Court of Sewers. Some one has evidently made free with my signature, and possibly it may have been one of those which cost the Great Central Company something to obtain. I enclose you my card, and shall be willing at any time to prove the above facts. MENTOR.

London, Jan. 6, 1851.

LESMAHAGO CANNEL COAL.

SIR,—In the last Journal, there is a note added to the remarks upon the Scotch cannels, in which the residuary products of Lesmahago coal are quoted as worth 20 per cent. of the cost of the coal. Lesmahago coal is used more or less over the length and the breadth of Scotland, and the statement may be correct so far as regards a particular locality. Referring, however, to Glasgow and the West of Scotland, it will be found that the present value of the residuary products from them is from 35 to 40 per cent. of cost at the gas works. At Paisley Gas Work, the tar is sold in the work to the British Asphalte Company at 8s. 9d. per 100 gallons, and the ammoniacal liquor at 2s. and 2s. 6d. per 100 gallons, according to strength, coke is 5s. per ton. In Hamilton the tar is sold at the work for 6s. per 100 gallons, and coke at 5s. per ton. Paisley is seven miles West of Glasgow, and Hamilton ten miles South.

Having troubled you with this, I may also notice an error in the same note with regard to the place where one of the Scotch cannels is said to be found. Arniston coal does not belong to the vale of the Clyde, but is a continuation of the coal-field worked by the Marquis of Lothian, and forms a portion of the Forth or Lothian coal basin at its south-eastern out-crop.

Cappledrae, Old Wemyss, Lumphinnan, Methill, and Lochgelly are found upon the north side of the same basin.

Skaterig, Knightswood, Kelvin, are names of the collieries most heard of, which are established upon the northern out-crop of the Clyde mineral basin, where the coal beds, with "cannel" in them, are found. They are in the same field, have the same general characteristics, and are all within a few miles distance of each other. Lesmahago coal is found upon the southern out-crop of the Clyde basin, about twenty-five miles to the south of the above-mentioned collieries, and about twenty-one miles south of Glasgow. Like the best of the more valuable "cannels," it is one of the coal beds of the marine or carboniferous limestone group.

I expect you will notice the matter of the per centage which the value of the residuary products from Lesmahago coal bears to the cost of them, in any way you may think best.

Auchinheath, Dec. 11, 1850. JAS. FERGUSON.

[Our correspondent, not being a practical gas manufacturer, has fallen into an error in confounding the "*surplus* residuary products" of the distillation of coal with the "*gross*" residuary products. In the former case the value of the fuel required for the heating of the retorts is deducted, whether coke or coal be used; whereas in the latter case the *total* value of the coke is reckoned without deduction for fuel, which, in such a calculation, would form a separate charge, but in ours is consolidated so as to render comparison more easy. Where *coal* and not *coke* is used as fuel, the value of the surplus residuary products is ascertained by the following process:—

Supposing the cost of one ton of coal or cannel to be ..	15s.
And the gross value of coke, breeze, tar, &c., say ..	5s.
Less cost of coal for distilling one ton of coal or cannel	2s.
The surplus value of the residuary products will be ..	3s.

or 20 per cent. of the first cost of the coal. These figures are of course purely imaginary, and intended solely to exemplify the difference between "surplus" and "gross" residuary products.]

THE PRODUCTS OF THE DISTILLATION OF COAL.

SIR,—Your Journal has been for some time the vehicle for discussing the productive qualities of various descriptions of coals and cannels, to which subject much attention appears to have been given; but, as the general results fall short of what may be obtained by the adoption of a system of manufacture based upon scientific principles, it may be as well to draw attention to the subject, by stating a few facts for the information of those who are interested, showing to what extent the production of gas can be carried.

It will not be necessary to enter very fully into the question, by giving a detailed account of the proportionate productive qualities of different materials, as these have been already extensively given in your publication, and are, no doubt, correct. It may be sufficient, therefore, for the intended purpose, to give the following general results from working the superior classes of the two principal materials in use, viz., coal and cannel.

From the former of these, an average of from 11,400 to 11,500 cubic feet of gas, and from the latter an average of from 11,800 to 12,000 cubic feet, can be produced from the ton of 2240 lbs. in the usual space of time allowed for distillation.

It may appear that so large a production of gas cannot be obtained without injury to its quality; but a slight examination of the secondary products obtained during the process of distillation will make it evident that there exists the material for producing a much larger quantity of gas of superior quality than is now generally obtained.

Of these general products, which need not be particularized, tar alone may be considered to possess gas-giving qualities.

It is well known that carbon and hydrogen are capable of uniting in the same proportions by weight, to form a series of gases and liquids, which are different only on account of the different amount of contraction of volume which their elements undergo at the moment of combination; amongst the number is the material called tar, which consists of pitch and various light and heavy oils. If, therefore, by the adoption of a complete system of manufacture, the conversion of the gases eliminated during the process of distillation into those liquids can be prevented, an increase in the quantity of volatile gas will be the result; and as the liquids named contain a much greater proportion of carbon than olifiant gas, which is superior in its light-giving qualities to all others, the gases so obtained should tend to improve instead of deteriorate the general production, and this experience proves to be the fact.

Probably these short remarks may be the means of drawing attention to the subject, and of leading to valuable results; if so, the object of the writer will be realized.

The schemes which have been brought forward during the last few years show the numerous attempts which have been made to improve the manufacture of gas, with a total disregard, in many instances, of existing interests; but if parties engaged in the business would set aside less important questions, and give their attention to those points which will amply repay them for the labour bestowed, considerable advances might be made, and the property invested in gas operations, instead of suffering depression, would be improved, and the attempts made to injure it rendered more difficult and remote.

January 7, 1851. X.

WIGAN CANNEL COAL.

SIR,—In several of your publications I have seen advertisements and articles on the quality and productive powers of different varieties of cannel, which are erroneous as regards the Wigan cannel, to an extent that requires correction. In the whole of the analyses that I have seen, there does not appear to be one in which the Wigan cannel *proper* has been taken into consideration; the whole of them coincide with the character of the Worsley cannel, which is of a very inferior description to the true Wigan cannel.

It will be sufficient for the sake of explanation to take an advertisement which has repeatedly appeared in your Journal. I allude to that of "James Ferguson, lessee of the Auchinheath Coal Field," which gives the Wigan cannel a production of 9500 cubic feet per ton, and the Yorkshire parrott coal about 11,500; and stating that both these cannels were used at the Manchester Gas Works. The best answer to this statement is the following analyses of the gas from Wigan cannel of the Ince Hall Works, and also from the quality of Yorkshire, being the result of above thirty trials, both on a large and small scale, made by John Leigh, Esq., consulting chemist to the Manchester Gas Works:—

Ince Hall cannel . .	11,673 feet per ton.
Dewsbury do. . . .	11,300 „

The quality of the Wigan gas is of a much superior quality, as the following test of the consumption of oxygen will show:—

Ince Hall gas, .	100 vol., required 147 oxygen.
Dewsbury gas	100 vol., „ 137 „

The specific gravity of the gas from our cannel being 620, instead of 460 to 520, as stated by Mr. Ferguson.*

The quantity of coke produced from Wigan cannel is 13¼ cwt. to the ton.

The report of the chemist to the Manchester corporation, the gas works of which body we are now supplying with three-fourths of their consumption, is quite sufficient to set at rest the question of the production of Wigan cannel. HUGH FENTON.

Ince Hall Coal and Cannel Works,
near Wigan, Jan. 1, 1850.

Register of New Patents.

CHARLES COWPER, of Southampton-buildings, Chancery-lane, chemist, for "*improvements in the treatment of coal, and in separating coal and other substances from foreign matters; and in the manufacture of artificial fuel and coke; and in the distillation of tar and other products from coal, together with apparatus employed for the said purpose.*" Patent dated Nov. 2, 1849. (Communication.)

The patentee states his invention to consist of four distinct processes,

* This latter statement is made on the autho ity of Dr. Fyfe, in his paper read before the Royal Scottish Society of Arts, April 24, 1848.

either of which may be used separately, or the whole used in connection with one another, forming a complete system, which he designates by the term "the treatment of coal."

The first process is the purification of coal, or the separation of coal from pyrites and other foreign matters; this process is also applicable to the separation of metallic ores from earthy matters, and generally to the separation of substances which differ in specific gravity, and are not injuriously acted on by water.

The second process is the coking of coal.

The third process is the distillation and treatment of tar.

The fourth process is the manufacture of artificial fuel.

The method of effecting the distillation of tar is the only part of the patent interesting to our class of readers. The patentee states that by distillation tar is separated into two portions—oil and pitch; the problem to be resolved is, how to effect this separation in the best manner. The ordinary method of distilling tar is attended with many disadvantages, especially in the decomposition and loss of a portion of the oil, by the heat required for the distillation. In the patentee's process the tar is placed in a boiler, similar in construction to those used for steam engines; this is filled to one-half, or at least not more than two-thirds its capacity, by means of a stop-cock funnel, placed at the top of the boiler. The stop-cock having been closed, heat is applied to the boiler, and when, by the action of the heat, the tar is at the point of ebullition, a jet of steam is introduced into the boiler by means of a tube passing down through the upper part of the boiler to within a few inches of the bottom of the tar. The end of the pipe branches off on each side, and to the two extremities are attached projections similar to the rose of a water-pot. The effect of the steam is to produce an ebullition, which aids the boiling of the oil. By this means any sudden increase of the heat is avoided, which otherwise would quickly injure the oil and decompose a part of it. The vapours of the oil and water are conducted through an exit-pipe, placed at the top of the boiler, into a carefully-closed condenser. This pipe crosses a box or vessel, filled with running water, in its way to the condenser. It is here the condensation of the vapours commence; the small quantity of condensed vapour in the exit-pipe is collected by means of a raised edge or gutter, and reconducted to the condenser by a small inclined tube. An air-pump is placed upon the condenser, or made to communicate with it. It commences with drawing the air from the distillatory apparatus, producing a vacuum, and its action should be continued, although but gently, in order to maintain the vacuum, by withdrawing the air which is obtained by the ebullition of the matters undergoing distillation and the air introduced by the steam. The vapours which are not condensed in the pipe before arriving at the condenser are there completely condensed by the influence of a jet of cold water drawn through a tube furnished with a stop-cock by means of the vacuum above mentioned, such tube dipping into a reservoir of cold water, having been previously exhausted of air. The completion of the operation is known by collecting, by means of a glass globe, some of the vapours through a pipe placed in the neck of the exit pipe, and furnished with a stop-cock. If no traces of tarry matter are apparent, the operation is finished. The cock of the tube through which the steam is admitted to the stills, and the tube through which the cold water is admitted to the condenser, is then closed, and the cocks of the supply and discharge pipe opened; air is thus admitted, and the pitchy residue runs off into suitable receivers. The distilled oil and water in the condenser are separate from each other, by reason of their differing in specific gravity. The oil is drawn off by suitable means. It is found that the oil which has by this process been well washed as it condensed is free from much of the empyreumatic odour usually accompanying the distilled oil. The condensed water from the steam, as well as that introduced into the condenser for the purpose of effecting the condensation, returns into a cistern by another tube, which should be of sufficient length to enable the water to descend, notwithstanding the effects of the vacuum.

Miscellaneous News.

ASSOCIATION OF GAS FITTERS.

90, ST. MARTIN'S-LANE, LONDON.

Tuesday, Dec. 10.

There was a full attendance of the members and their friends, amongst whom we noticed Dr. Bachhoffner, S. Andrews, Esq., secretary of the Equitable Gas Company, &c. &c. Mr. Dethridge presided, and briefly stated that they had met that night to witness the testing of a self-regulating burner invented by Mr. Biddell, of Ipswich, who having solicited permission from the association to display his invention at one of their meetings, a sub-committee, consisting of the chairman and Messrs. N. Defries, D. Cowan, and P. Coward, had been appointed to test it; and, without entering into the merits of the matter further than to say that they thought it possessed sufficient value to justify their acquiescence, he would now call upon Mr. Biddell to introduce his apparatus.

Mr. Biddell, in attaching his burner, regretted that the pressure of gas was so weak as to compel him to have a small gas holder in the room in order to be able to test the burner at all. The great value of the burner consisted in this—that whatever amount of pressure might be on from the works, or with all the other lights in an establishment suddenly extinguished, no difference would be discovered in the height of the flame. It might be regulated to any height required, and there maintained.

A long and animated conversation then took place, which resulted in the unanimously passing of the following resolution:—

"That this society, having, at Mr. Biddell's request, tested his self-regulating burner, are of opinion that it possesses considerable merit."

The President then stated that many, if not all, of the gentlemen present were aware that a movement had recently taken place in the city of London, having for one of its objects a public exposition of gas models, and that this association being the legitimate hinge upon which such a movement should turn, an amalgamation would, in all probability, soon take place.

Several new and influential members were admitted, and, after some minor matters had undergone consideration, the meeting was about to close, when Mr. N. Defries desired permission to say a word or two. He reminded the meeting of the great importance of the task they had undertaken, viz., the protection and the furtherance of the interests of an increasing and highly respectable trade; he bade them remember the great things being done for the next year, that, through the agency of a noble Prince, who had highly distinguished himself by his judgment and moderation, they were about to have a great exhibition of all that art or nature had produced throughout the world. But there was one thing with the Exhibition which would not materially benefit them as a trade, and that was, that the articles exposed there would not have gas to show them in action. Now, he maintained that having gas in such a case was indispensable; and for that reason he begged their co-operation and support in making this excellent association the instrument for effecting that great good. What could be better than to have a spacious room and the means for every gas engineer or gas fitter to place any apparatus that he may have invented or patented, so that it might at all times be seen in action, and by that means the public would have a far better proof of the immense value of gas than by any other plan? For his part he did not care whether his own inventions were exhibited or not by this association, as long as its general objects were considered, and the interests of gas lighting promoted; but so convinced was he that this society must be the means of carrying out the plan broached in the City, and that funds would be wanted for the purpose, as soon as they were ready for action he would give ten guineas to promote the undertaking. (Cheers.)

An announcement that Dr. Bachhoffner would in all probability lecture on the next occasion followed, and the meeting adjourned.

ROYAL SCOTTISH SOCIETY OF ARTS.

Mr. Buchanan concluded his description of the high chimney lately erected under his direction at the Edinburgh Gas Works, the first part of which was given in our last. He commenced by some observations on the effects of the draft in the chimney, a subject of great importance in regard to chimneys generally for large furnaces, where enormous quantities of air are continually passing in the act of combustion. This had been estimated by the eminent chemist, Professor Thomson, of Glasgow, at 150 cubic feet per minute for every pound of coal consumed, and 50 more for waste—in all 200. Hence in the boilers of many steam-vessels, for example, consuming one ton per hour, 7400 cubic feet of air per minute must pass up their narrow funnels, and, being limited also in height, must be raised to a high temperature, and this, as at present constructed, by a great sacrifice of fuel. In the gas works the 68 furnaces consume 34 tons in 24 hours, requiring a current of air at the rate of 10,000 feet per minute, which the old chimneys were incapable of drawing. Mr. Buchanan then stated the principles on which the power of draft must be calculated, referring to the article *Furnace* in the "Encyclopædia Britannica," last edition, where he had occasion to explain the subject. The power of the draft was directly proportional to the height of the chimney, and the velocity with which the external air rushes in to supply the draft was proportional to the *square root* of the height of the chimney. The internal heat, however, was the grand moving power, expanding the air within the chimney, and giving it a buoyant or ascensional power. With 488 degrees of temperature the celebrated chemists, Petit and Dulong, and most accurate observers, have found that air expands into double its volume. With this temperature, therefore, within the chimney, the velocity with which the external air was capable of entering at the bottom of the chimney, or into the furnaces or flues, would be proportional to the square root of half the height of the chimney, and, expressed numerically in feet per second, would be equal to six times the square root of half the height,

or $V = 6\sqrt{\frac{H}{2}}$, V being the velocity in feet per second, and H the height of the chimney. This forms an easy rule for this particular temperature, and if we apply to it in the present case, taking the height of the chimney from the entrance flue at 330 feet, would give a velocity of about 50 feet per second, or 34 miles an hour, equal in the atmosphere to a very violent gale of wind. Taking the smallest area of the chimney, where it is 11 feet 4 inches in diameter, at 100 square feet, this with such a power of draft would be capable of discharging 30,000 cubic feet per minute, which is amply sufficient for the present works and any extensions. The actual results have proved very satisfactory. Not only is there a draft in the furnaces, whereby they are wrought most effectually and with great economy of fuel, but by making one or more openings at the bottom of the chimney a powerful blast of air sets in from all directions, carrying off vapours and all impurities, and producing a cool atmosphere in every part. On measuring the power of draft with a water-pressure gauge, he found it drew up a column 3½ inches high, there being a good deal of wind at the time. The blast of air at the mouth of the opening, it is curious to observe, drawing the hand powerfully in, and a square board covering the opening it was difficult to withdraw, exerting a pressure of 15 lbs. on the square foot. High winds have a sensible effect on the draft, sometimes raising the water-gauge to the height of 6 or 7 inches. A pressure of 2½ inches, which it would be in calm weather, is very nearly equal to a column of air half the height of the chimney, and this agrees very well with the above calculation, as the interior temperature would not exceed 480 or 500 degrees. As a general rule for calculating the power of the draft at any temperature, the following would be found simple and agreeable to the practical

results, $V = 6\sqrt{\frac{nH}{488+n}}$, n being the number of degrees of temperature.

Mr. Buchanan then gave a detail of the experiments, formerly alluded to, made upon the strength of the bricks for the chimney in fourteen specimens of different qualities and compositions. By far the strongest was the composition of fireclay and ironstone, which bore, making every allowance, from 200 to 350 tons on the square foot; while the common quality did not exceed from 60 to 120. The Hailes stone bore upwards of 450 tons, greatly more than the result found by the experiments already shown to the society, but which, being on small specimens, 1 inch cube, while the other was 4 inches cube, the effect might partly be due to this circumstance, together with the difference of quality in the specimens.

A Detailed Description of the above Chimney. By M. TAYLOR, Esq., Engineer for the Edinburgh Gas Works.

In this paper Mr. Taylor gave a minute detail of the dimensions and structure of every part of the work. The foundation was on hard shale or clay; the masonry 40 feet 6 inches square at the bottom, 12 feet below the surface of the ground; 32 feet 6 inches at the surface of the ground; and brought up by steps in hard foundation courses of Craigleith stone, dressed and square jointed. Masonwork of the most substantial description, with four eyes for connecting the main flues to the stalk. Square pedestal 65 feet high from surface of ground to top of base of brick shaft; 30 feet 10 inches square at base course; 30 feet square above base; and 27 feet 9 inches under moulding of top. Body of pedestal of neatly-covered rubble-work of the strongest kind, the stones chiefly from Hailes Quarry of the best rock. The cope mouldings and base of brick shaft of Craigleith. Within the pedestal, and rising 20 feet above it, is an inner chimney, or brick shaft, standing quite detached, having a space from 18 inches to 2 feet clear in every part; this space covered over at the top to keep out soot deposit, but yet left free of the outer pedestal and chimney. The inner chimney is 90 feet high, 13 feet diameter inside, carried up at four different thicknesses, beginning at $3\frac{1}{2}$ bricks thick, and ending at 2 bricks, including a lining of fire-brick, carried up the whole way at two thicknesses—20 feet at 10 inches thick, and 70 feet at 5 inches. The brickwork of the best well-burnt circular stock-brick, with a course of headers in reeled order for every four courses of stretchers. The main brick shaft is 264 feet high above the stone pedestal; making, with the pedestal, 65 feet, and foundation 12 feet 6 inches—in all 341 feet 6 inches. The shaft is 26 feet 3 inches diameter at bottom externally, tapers to 13 feet 10 inches at the height of 243 feet, at the first belt under coping 11 feet 10 inches below the top. The shaft is carried up at five different thicknesses, beginning at 35 inches, or $3\frac{1}{2}$ bricks, for 35 feet up, and ending with 15 inches, or $1\frac{1}{2}$ brick, for 58 feet at the top, all built with hard circular composition brick, referred to in the experiments on the strength of bricks. Brickwork put together in the strongest manner with headers, as already described, and best band all laid in the best lime from Burdiehouse, with sharp sand, sifted and made up in the mill. The beds are kept as thin as possible, and neatly pointed in with the edge of the trowel. All the vertical joints inside of wall grouted up with thin lime. As a farther security, the shaft is bound with six malleable-iron hoops, at intervals of 35 feet up, built into the brickwork, one brick on bed from the outside, and kept a $\frac{1}{2}$ inch clear all round off the outside lining of brickwork, so as to allow the hoops to expand with heat without injury to the work. They are all 3 inches broad; the under three 1 inch thick, the upper $\frac{3}{4}$ inch each, made in three lengths, clamped together and made fast with three $\frac{7}{8}$-inch or $\frac{3}{4}$-inch rivets on each side. The projecting cope at the top is of cast iron, 19 feet 6 inches diameter over all, and in sixteen pieces about $\frac{7}{8}$ inch thick, screwed together with bolts through the flanges. This cope being all fitted and bound together in a mass on the top of the stalk, the brickwork was continued up, and finished with a cope, or plate of cast iron, composed of eight pieces $\frac{3}{4}$ inch thick, and about $2\frac{1}{2}$ feet broad, with a round belt going 9 inches down on the brickwork, and forming a strong hoop round it. The chimney is furnished with an endless chain going up the inside of the main shaft, giving the means of ascending at any time to the top. The electric conductor stands 6 feet above the top plate, $\frac{3}{8}$-inch round copper made fast to stone and brickwork with $7\frac{7}{8}$-inch copper holdfasts let 4 inches into the masonry or brickwork, with a head on the inside and an eye on the outside to receive the rod as it was carried up. By these holdfasts an ascent can easily be made to the top by a small tackle suspended to the holdfasts. The conductor is metallically connected to all the ironwork on the stalk—the plate on the top projecting cope, malleable-iron hoops, bolts on the top of the stone pedestal, and also the ascending chain. The rod descends into a well about 10 feet from the foundation, and is immersed about 8 feet deep in water, and the end turned up 2 feet in a horizontal direction, and flattened.

WESTERN METROPOLITAN GAS QUESTION.

AMALGAMATION OF THE CHARTERED, THE LONDON, AND THE EQUITABLE GAS COMPANIES.

On Wednesday evening, Dec. 10, a numerous meeting of the parishioners of St. James's was held in Willis's Rooms, Brewer-street, Golden-square, in accordance with a requisition to the churchwardens, "To take into consideration the best means of protecting their interests against the coalition of the Chartered, London, and Equitable Gas Companies; and likewise to consider whether the circular of the Chartered Gas could be true or not." The circular referred to was as follows:—

"SIR,—The directors of this company having *ascertained* that leave has been given to break up the streets of St. James's parish, to enable a New Company to supply Cannel Gas, I am instructed by them to inform you, that they are quite ready to offer you the CHOICE (*and from mains already laid*) either of *pure cannel gas* at 6s. per 1000 feet, or of *rich Newcastle gas* at 5s. per 1000 feet.

"And I am to express their regret at the *inconvenience* you have already suffered, which might have been avoided, *had it been intimated to the directors that a preference for this kind of gas existed*, they having, *long ago*, been in a situation to furnish it from a separate portion of their works, which they adapted in pursuance of a contract entered into for supplying the Houses of Parliament, should they require it.

"Allow me to assure you, that neither as to quality or price, shall any company be allowed to place you upon better terms than this, which has been established for so many years, and enjoyed your friendly support.

"I am, your obedient servant,

"C. BURLS, Secretary.

"Chartered Gas Works, Westminster Station, Horseferry-road, Chief Office, Bridge-street, Blackfriars,
Nov. 29, 1850."

The following handbill was distributed to all on entering the room:

"GAS MONOPOLY.

"Some inhabitants of St. James's have expressed alarm at the proposed amalgamation of the three old gas companies who have hitherto supplied the parish.

"The object of that amalgamation is to benefit the public by reducing expenses, and thus enabling the supply of a pure and brilliant gas at a cheaper rate, and to obviate the recurrence of continual disturbance of the pavement of the streets."

The chair was taken at seven o'clock by Mr. WILLIAM GERSIN, the Senior Churchwarden. He said that the meeting had been called by his colleagues and himself in consequence of a very numerously signed requisition of gas consumers to consider the circumstance of the amalgamation of the three old gas companies which had pipes in the parish. They all knew with regard to gas that it was as desirable that we should have a pure light in gas as in religion. (Hear, hear.) Since he had come into the room he had seen a very extraordinary bill headed "Gas Monopoly." [The chairman here read the handbill given above.] "The supply of a pure and brilliant gas." He considered that this evidently admitted that it never was so before. (Loud cries of "No, no," and "Yes, yes.") Amalgamation meant according to all intents and purposes, when they found the per centage coming in to the shareholders, benefit for those who amalgamated, and loss to the consumers. They would not have appeared there that evening had the gas been "pure and brilliant." (Hear.) He would say from his own personal knowledge, that though the companies themselves had not arrived at the same conclusions, the complaints throughout the parish of the impurity of the gas were proverbial. (Hear.) By two very curious circulars which he had had placed in his hands it appeared that the companies had only just made the discovery, on the 29th of November, that the streets of St. James's had been pulled up for a new company. (A laugh.) One of the circulars stated, "I am instructed by them to inform you that they are quite ready to offer you the choice of the two gases." He would ask how they would manage to have two gases running in the same pipe. (Hear, and a voice, "Read!") He would read the communications but not the names, for if the amalgamation took place these gentlemen would be in the power of these companies, however much the companies might assure them that they only wish to benefit them. ("No, no.") One communication was, "Sir,—I beg leave to acquaint you that the directors of the London Gas-light Company, being desirous at all times to meet the wishes of their consumers, have made arrangements for a supply of pure cannel coal gas to such as may prefer that description of gas at 6s. per 1000 cubic feet, manufactured by a most improved process, and producing the highest illuminating power, at the same time continuing, as heretofore, a supply to those who do not desire any change of gas at 5s. of equal purity and brilliancy with that which has hitherto given such entire satisfaction to the consumers who have used the gas of this company." The Chartered Company wrote thus: Here the chairman read the letter of Nov. 29 before quoted. Friendly support, indeed! He (the chairman) thought that it had been like Hobson's choice, they were obliged to take it, or none. (Hear.) Here was an offer from the Western Gas Light Company to supply the parish. "The Western Gas Light Company respectfully solicits the support of the gas consumers of St. James's on the following and other grounds: that it has been proved to the satisfaction of the paving and lighting commissioners, and agreed to be perfectly fair, that 500 feet of the Western Cannel Gas, costing the consumer 3s., affords more light than 1000 feet of ordinary gas costing 5s.; that the Western Company's gas is, by a patented process, entirely purified of the properties found in common gas to be injurious to health, and to the contents of shops and private residences; that the company, unlike many others, have bound themselves by heavy penalties, to St. James's parish, to maintain the superior illuminating powers of their gas to the satisfaction of a referee, appointed by the parish and paid by the company: that the Western Company have been the first to introduce cannel gas into the parish, and have not joined the coalition of the Chartered, London, and Equitable Gas Companies, against the interests of the consumers." (Cheers.) Now he would wish to state here, that he was not a gas consumer—that he did not hold any shares in any gas company, and not being in any trade or profession, wanted neither customers or clients. Nor was he interested in any degree, except as far as the interests of his fellow parishioners was concerned. (Hear.) They knew very well if this amalgamation were to take place, that these companies, with their enormous paid up capital, of which they vaunted so much, would make every effort to drive the company, which had come in for the benefit of the parishioners, out of the parish. Experiments had been tried with respect to the merits of the different gases, and in presence of the company's officers, and their result had been highly favourable to the Western Company. (Hear.) He considered that Lord Seymour, as Commissioner of the Woods and Forests, and as a Government officer, had committed himself most egregiously. The chairman of these two companies, with Mr. B. Hawes' father, the deputy-chairman of the other, went to Lord Seymour for permission to break up the ground in Regent-street—these gentlemen who, according to their circular, had

such an objection to "the nuisance of continually disturbing the pavement of the streets." (Laughter.) They succeeded, as a matter of course, but he (the chairman) was sorry to say that when the churchwardens went for like permission, the result was not the same. They only obtained partial permission; the authorities took time to consider. They would not actually prevent the company from running across the street, and connecting one part of the parish with another, and hence arose that the Western Company had not been able to go over the whole parish. (Hear.) People were inclined to think that an act had the same extraordinary effect as a bull—(a laugh)—but the question was, would the parish submit to it? (Cries of "No, no.") When they had got their act and would be speaking of their "large paid-up capital," he would like to know what would become of this large "paid-up capital" in a short time if no one took their gas. (Cheers). In conclusion he said that it was merely at the request of his fellow-parishioners that this meeting had been called, and they would come now to the decision they thought best—(Hear).

Mr. James Coppock said he would be glad to know, as was the usual course of proceeding, by whom the requisition to call the meeting was signed, and by how many? (Hear).

The Chairman refused to read the names; the ratepayers were quite safe in his hands. There were about sixty or seventy names appended to the requisition, which the chairman then read. He would not give the names, because the gas of these gentlemen would be immediately cut off. (Cries of "No, no," and loud cheers.) He was too old a bird to be caught by chaff, or by salt on his tail. (A laugh.)

Mr. Coppock demanded that the question, whether the names should be read, should be put to the meeting, for he considered that without them the meeting would not have its full weight.

The Chairman said he had been told of an instance that day of a friend of his having had his gas cut off. ("Oh, oh," and applause.)

Mr. Coppock: Am I to be told that persons are to be threatened in this time of competition? (Hear, hear.)

A Voice: I should think that man had not paid for his gas. (A laugh.)

Mr. Sprague, of Bond-street.—There can be no difficulty in giving the name of that company. If the name is not given I shall denounce it as a falsehood. ("No names!" hisses, and cheers.)

The Chairman.—That is doubting my word. I will ask that gentleman, is he connected with any of the companies? (Hear, hear.)

Mr. Sprague.—I am a director of the London Company, and, consequently, a ratepayer too. (Hisses, and loud marks of disapprobation.)

The Chairman said that they did not want to hear any directors. (Cheers and laughter.)

Mr. Coppock then moved that the names of the requisitionists should be read.

Mr. W. Pearse.—I second it. I belong to the Chartered Company, which pays rates. (Hisses and laughter.)

The Chairman.—I won't take the Chartered Company.

Mr. Miller, of Piccadilly, seconded the motion, which was put, but lost by an overwhelming majority.

Mr. Henry Bidgood made a lengthy statement in opposition to the projected coalition of the gas companies. He was not a shareholder, and therefore not interested either one way or the other. The only reason that the companies could possibly have, at any time, been admitted into the parish was on the ground of their competition, excepting that any one of them, on coming into the parish, had offered a better and cheaper article. But it was not so; and the only ground, therefore, of their admission was competition. (Hear, hear.) Whether they might not have seen whether the Chartered Company was not made of squeezable materials, and that the same advantages might not have been gained without competition before this admission, was a grave question, but need not be discussed there. With regard to the "ploughed fields" spoken of, they had certainly been caused by the *admission* of the Western Company; for, no sooner was a nice line made through Pall-mall by one trench, than the other companies discovered numerous wants to be supplied in the laying down of *their* mains. The old Chartered Company found out that the 6-inch pipe was not near large enough for their supply, though it had been used by them for years without discovering any defect. (Hear, hear.) These companies had been admitted, then, only for competition; but it was found out that the three companies were, in fact, in a state of coalition without needing any act of Parliament. He wondered if the secretaries were acquainted, for they dated all on the same day. (A laugh.) Had they secured competition? It was a complete farce talking of competition. A friend of his took a house in Pall-mall, and, having paid three quarters for gas, the next quarter he was surprised to find an account left for arrears, amounting to £7. 18s. 9d. On asking for an explanation he was told, "Oh, it was owed by your predecessor." "Well," said he, "I will not pay it." The clerk said he would look in on Saturday, and he did so; but he was not paid. The clerk called again, and again; but at last he left word "that, if the money was not paid next Saturday, the gas would be cut off," and on the following morning they did call and cut off the gas.

Mr. Sprague: Name the company, and give particulars and dates.

Mr. Bidgood: If Mr. Sprague were not here I should say the London Company. (Laughter.)

Mr. Sprague.—Mr. Bidgood seems to know more about these matters than I do. Let him give the name. (Oh!)

Mr. Bidgood.—I will give it. It is James Clothier, watchmaker, 121, Pall-mall, opposite her Majesty's Theatre. Mr. Bidgood continued to state that Mr. Clothier went then to the Chartered Company and gave directions to have gas supplied at 121, Pall-mall. He was told that it would be put on in the afternoon, but the afternoon and evening came and no gas, and two good wax candles figured in Mr. Clothier's window. He went and asked the reason of the neglect at the Chartered Company's office. He was told:—"We understand, sir, that there is some little difference of opinion existing between you and the London Company, and will you be so good as to get it arranged, and then we will put on the gas." (Cries of shame.) Was this coalition for the benefit of the company? (No, no.) Mr. Clothier, however, went to his lawyer, and the secretary then sent word that he would be glad to see Mr. Clothier, and the gas was put on, and a receipt given for the money. (Cheers.) Their interest, and the interest of companies could never be identical while such was the conduct of the latter, and while the parishioners had no control over them as they had over water companies. (Cheers.) He had established then two things—first, that these companies were admitted to compete with each other: secondly, they had not done that for which they were admitted, but that the Western Company stood alone and needed support. (Hear.) He had seen a very curious circular from Mr. Burls, who was then present. It was dated 29th Nov., and stated that, "The directors of the Chartered Company had ascertained that leave had been given to break up St. James's." What had the company been doing then the whole, or nearly the whole of the year? The application for "breaking up the parish" was made April 3, 1850, and they had only ascertained it on Nov. 29. In January he (the speaker), and others went to the Chartered Company, and asked them to reduce from 6s. to 4s. without agitation, by which the reduction had been effected in other parishes. They had reduced in other places on account of the agitation, and they were then asked did they put a premium of 2s. on agitation, for if so, the parishioners of St. James's would also work the oracle, and obtain a like benefit. (Hear, hear.) The company replied that if they had come down in the City, it was because they had a knife to their throats, and it was a question of life and death. There was also a second meeting with the company, when the Western Company had made their application. The board then said, "We stand now on a different footing to what we did before, because we have an offer from the Western Company." "We can't do it," said the company, "but we'll come down to 5s. on Lady-day." This offer was taken of course, and they went on with the Western Company that the Chartered Company might think "These St. James's fellows will get all they want, if we don't look sharp." (Laughter.) All this took place in April. Now, in the circular, it is stated that they would supply the consumers with a certain sort of gas from mains already laid down. He was aware that they had one set of pipes throughout the parish, but doubted whether they had two.

Mr. Sprague said they had not.

Mr. Bidgood would like, then, to know how, without amalgamation, they could offer two distinct kinds of gas; and that he thought accounted for the "ploughed fields," with all the ties, and connections, and adjustments. (Hear.) He was prepared to prove that not only the Chartered, but the Equitable and London, had *not* pipes all over the parish; and how, then, in the name of common sense, were they to supply two different kinds of gas except to the aristocratic parts of the parish, leaving those to whom it would be of more service without it? (Hear, hear.) He held in his hand a list of the streets, alleys, and courts where the London and Equitable, conjointly with the Old Chartered, had mains, and where these were he could very well understand how, if one could not supply a thing and another had got it, one could help the other out of the difficulty; but where neither of them had it *all* over the parish, he was at a loss to understand how they could supply two sorts of gas. (Hear, hear.) He would be met by this question, "Did the Paving Board of St. James's ever ask the Chartered Company to supply cannel coal gas, to which the simple answer would be, "If you mean in those precise words, no!" But he could tell them a conversation which took place with a gentleman named Hawes (a laugh), Mr. Hopper and Mr. Winsor being present. When asked in conversation, "Will you supply us with cannel coal gas at 5s.?" Mr. Hawes said, "Oh, no, certainly not!" "Well, at 6s." "Oh, it could not be done. In fact, you know, gentlemen, cannel gas means something or it means nothing. Cannel gas, you may make from a very inferior quality of cannel coal, and then it would not be so near as good as our rich Newcastle. Try our rich Newcastle at 5s." (Laughter.) He (Mr. Bidgood) pledged his word and honour that this conversation took place. Would they imagine, then, that the directors were anxious and prepared to supply, if they had been asked, this description of gas? How long ago were they enabled to do so? Just as long ago as they were asked to enter into the contract with the Houses of Parliament. If he was rightly informed, some sort of a gasometer had been put up at the Horseferry-road, and a pipe had been laid along the road to supply the Houses of Parliament, but he was not certain whether it had been used or not. Did that look as if the company were anxious to supply them?

Mr. Sprague: We were not anxious.

Mr. Bidgood: Was it not true that a considerable per centage, certainly exceeding 10 per cent., of cannel coal, had been used by the various companies seeking the amalgamation, to improve the quality of the gas?

Mr. Sprague: No.

Mr. Bidgood said, that on the previous evening he had the Chartered Company's gas in his house, and he would say that there was hardly anything left to be desired so good was the gas, and the Western Company did not come into the parish on fair terms, because the other companies had been sending out so fair an article since the competition had been raised. He had it on the authority of a gentleman connected with the Equitable Company. He (Mr. Bidgood) remarked that the gas was very good, and asked if there had been any cannel coal mixed with it? "Oh, yes," he said, "we do not now put in a single charge without a large proportion of cannel coal." (Hear, and laughter).

Mr. Sprague: It has been used since I knew anything about gas.

Mr. Bidgood: Well, perhaps, not to the same extent, as O'Connell asked a witness once, when he was trying the point whether a will was signed during the man's life. "Will you swear that the man signed that will when he was alive?" The witness replied, "When

he signed the will *there was life in him*," and the truth of that answer was secured by their having caught a fly and placed it in the dead man's mouth. (Laughter.) When circumstances required, these larger quantities were put in, and so notorious was it that a friend of his (Mr. Bidgood's) connected with one of the companies told him, when trying an experiment at Mr. Leslie's, that if he sent to the company for the gas it was no good, for if they knew the evening it would be so good that he would know no difference. Did they want cannel coal gas? If so, he would not advise them to go for it to either of the three companies among whom there was such an evident leaning for "our rich Newcastle." (A laugh.)

Mr. SPRAGUE: What we desire is to be in a situation to supply it, as we expect the consumers will readily fall back upon it. (Hear.)

Mr. BIDGOOD said that they were challenged to see a set of experiments carried out, and the paving board did not do things behind their backs.

Mr. SPRAGUE: But you let the Western Company know, and had their engineer to do it.

Mr. BIDGOOD denied that the Western Company had any more knowledge of it than the other companies. They brought the gasometer to Mr. Leslie's, took it thence to Mr. George Lewis, ironmonger, Knightsbridge, by whom it was filled, and the experiments of Mr. Leslie showed variations of from 76 to 117 per cent. superiority of the Western gas over that of the other gases. On the second occasion they went to Mr. Barrett, gasfitter, of Windmill-street and Knightsbridge, and the gas was obtained from No. 16, Princes-gate. On the third occasion, it being desirous to obtain all the gases under similar circumstances, they went to a place where both the mains went through the same street, and a connecting pipe from both into the house. 100 per cent. was the illuminating power of the Western Company's gas beyond that of the others; and the third experiment merely confirmed the others. It was also demonstrated that the Western Company's gas was more suitable for burning in private residences, and less injurious to silks and other things kept in shops. Mr. Bidgood then quoted the commencement of the leading article of the editor of THE JOURNAL OF GAS LIGHTING for December, and continued:—"The more complete union of *their* conflicting interests." But where were the consumers? (Hear, hear.) He might also ask how it was that "the requisite notice" had not been given earlier? (Hear, hear.) This was a matter affecting the parishioners' pockets, without reference to "blacks" or "blues"—(a laugh); and it appeared to him, first, that the London and Equitable Gas Companies were admitted only on the ground of securing for the parishioners a wholesome competition with the Chartered Company in the supply of gas; secondly, that the whole of these companies were now seeking to obtain an act of Parliament for the amalgamation of their interests, which, whatever the advantages the parishioners derived from competition, would be lost. Thirdly, That the Western Gas Company, recently admitted into the parish, stood alone against the combined companies, and had been the first to offer the supply of pure cannel coal gas, and that it was the duty as well as the interest of the parish to support it against the threatened coalition. Mr. Bidgood concluded by moving, "Resolved, therefore, upon these considerations, that a committee be now formed to protect the interests of the parishioners by supporting the Western Gas Company in the parish, and watching the progress of the amalmation bill through the houses of Parliament."

Mr. WOOLLAMS seconded the motion, and, having alluded to the experimool which took place,

Mr. SPRAGUE asked, Who directed the experiments at Pimlico?

Mr. WOOLLAMS: Mr. Alexander Wright, Gas engineer of Westminster.

Mr. SPRAGUE: How long before the experiment was the party in communication with Mr. Wright?

Mr. WOOLLAMS could not tell.

Mr. GABRIEL said that the communication was made in the morning, and it was settled in the evening. (Hear, hear).

Mr. SPRAGUE: It is of great importance to this meeting that my question should be answered.

Mr. WOOLLAMS: You have no right to ask it. (Cheers and hisses). Mr. Woollams stated that the gases were taken from the street, and he was ushered into a dark room to witness the experiments. The first two gentlemen he saw were Mr. Lowe and Mr. Evans, two officers connected with the Chartered Gas Company. As far as the experiment was concerned, Mr. Lowe said, "A more clever man or a more experienced man could not be had to carry on the experiments than Mr. Alexander Wright." (Hear, hear).

Mr. SPRAGUE: That is no answer.

Mr. GABRIEL: There are the signatures of the officers of the Chartered Company, declaring that the experiments were perfectly correct and fair. Do you repudiate that document?

Mr. LOWE, as engineer of the Chartered Company, indignantly denied that he ever signed that document, nor did Mr. Evans, and their names had been grossly misused. They saw the conclusion of some experiments which had been commenced before they got into the room; and he certainly said, that no man was more qualified for carrying out such experiment than Mr. Wright. It was, nevertheless, utterly impossible that a photometer could give the same results in two different experiments. If that document were to be believed, the superiority of the Western over the London gas was 132 per cent., while the company ascertained under the authority of Professor Miller that it was 72 per cent. Would the Company pledge itself to give a gas 132 per cent. better than that of the London?

The CHAIRMAN: Were you present at any of the experiments? and do you admit the result of them?

Mr. LOWE: I was present at two of them, but Mr. Wright had been three weeks preparing these experiments.

The CHAIRMAN: I am sure that Mr. Alexander Wright would not take advantage of any one. He admits that you objected to one of them, of which the result was favourable to you. (Cheers).

Mr. SPRAGUE: I beg to explain the reason why I put that question. (Loud cries of "No").

The CHAIRMAN: Will you allow a director of one of the companies to come here and put questions? ("No") Here are experiments made in presence of their own officers, who were satisfied with their results. (Cheers).

Mr. SPRAGUE: Mr. Bidgood has stated that if information had been given to the Chartered Company when the experiments were to be made it would be all up with the experiment of the Western Company.

Mr. BIDGOOD: I said we kept both companies in ignorance of the fact that we were going to make the experiments, because a gentleman of great experience in gas matters informed us that if any company had twenty-four hours' notice of our intention, they would produce an article very superior *as a test* to what they would usually furnish the parish with. (Hear, hear.) Therefore, we kept both the Chartered Gas Company and the Western Company in entire ignorance of the matter. (Hear, hear.)

A VOICE: Are you satisfied, Mr. Sprague?

Mr. SPRAGUE: No; not by a very great deal.

The CHAIRMAN: This, be it remembered, is a meeting of ratepayers, and it is improper that impediments should be thrown in the way of the business we came here to transact by those who are not rate-payers. (Loud calls for Mr. Wright.)

Mr. GABRIEL said that if Mr. Lowe and Mr. Wright were allowed to get into a discussion on the subject, the meeting would have a battle of the gases. This was a local meeting on a question in which gas consumers alone were interested, and he hoped no further interruptions would be permitted.

Mr. SPRAGUE: If you had answered my question in a straightforward way, all this interruption might have been saved. (Great confusion.) An insinuation has been just thrown out that if the Chartered Gas Company had been aware of the experiments about to be made they would have so prepared their gas as to defeat the object in view. ("No doubt of it.") I would now ask at what time Mr. Wright was told that those experiments were to be made. I can get no answer to that question. Mr. Wright is now here, I believe, and why should not the question be answered? At the time those experiments were made he was an interested party. ("No, no.") Mr. Wright had an undue bias, being then a shareholder in the Western Company, and also their embryo engineer. ("Hear, hear," and "No, no.")

Mr. MILEY regretted that Mr. Bidgood had prejudiced the meeting against what he (Mr. Miley) was going to say, by stating that he was in the same boat with Mr. Sprague. ("Shame".)

Mr. BIDGOOD believed that Mr. Miley had an interest in the three companies that were going to unite. If Mr. Miley denied being so then he (Mr. Bidgood) begged pardon for the insinuation.

Mr. MILEY said he was a shareholder in one of those companies, but he had opposed the introduction of that company into the parish as the records of the parish books would show. He did so because he considered that if they could not get competition enough from two companies they could not get it from three or four. (Oh, oh.) The Western Company had been a long time previously informed of the experiments, and a blackened room got ready for the purpose, but the Chartered Company only got notice of what was going to take place a few hours before the experiments were made. ("No, no," and "Yes.") He, as a member of the paving board, refused to attend because the companies were not put on a fair and equal footing. He thought it unfair to give one company an opportunity of having the gas cooked up for the occasion while the other company was entirely ignorant of what was going on. (Hear, hear.)

Mr. BIDGOOD denied the cooking. The results obtained from the experiments at Leslie's were the same as those demonstrated by Mr. Wright. Did Mr. Sprague and others mean to say that cannel coal required cooking to make it yield as good gas as rich Newcastle? An independent testimony, in favour of the cannel coal gas, was given by a correspondent of the JOURNAL OF GAS-LIGHTING, who stated that the coal used at Manchester yielded gas possessing 75 or 80 per cent. more of illuminating power than that from Newcastle. (Cheers.)

Mr. LOWE: That is true, but very inconsistent with 132 per cent.

Mr. SPRAGUE: All we ask is fair play.

Mr. BIDGOOD: I drew from Mr. Miley one admission, namely, that he was an interested party; but did he not state that he was not interested in any shape or manner whatever?

Mr. MILEY: No.

Mr. BIDGOOD: I say, yes.

Mr. MILEY: I protest against such false assumptions—I say false! false! (Cheers and considerable uproar.)

Mr. BIDGOOD would not allow his veracity to be impugned. When Mr. Miley opposed the London Gas Company in the paving board, his opposition was thought to be disinterested, but when it leaked out that he was a shareholder, it gave a different colour to his opposition.

Mr. MILEY (vehemently): I deny that I said I was unconnected with any gas company. (Cheers.)

Mr. BIDGOOD: No; that you were disinterested.

MR. MILEY proceeded to give a history of the invention of cannel coal gas, but was stopped by

The CHAIRMAN, who said it was irrelevant to the business of the evening.

Mr. MILEY: My character is at stake, and I will not be put down.

The CHAIRMAN: Mr. Miley has made his speech. (No, no.) He must object to Mr. Miley's continuing. (Loud cries of "Hear him.")

MR. C. COCHRANE rose to order, and expressed a wish that a fair opportunity might be awarded to all parties to state their opinions.

Mr. BEALE denounced the junction of the three companies as a gant monopoly, and one that, in these free trade times, ought not to be tolerated.

The resolution was then put to the meeting, and carried almost unanimously.

Mr. Sprague protested against the conduct of the chairman in not allowing him a hearing.

Mr. Beck also claimed a hearing, which, after considerable discussion, uproar, and confusion of a most boisterous character, was conceded. He said he was a director of the Chartered Gas Company, was, therefore, a ratepayer of St. James's, and had a right to be heard. He was not probably much known to gentlemen present, but he believed that those who knew him would do him the justice to say that he never pledged himself to anything which he did not mean to perform. He appeared there as the organ of the Chartered Gas Company, and staked his credit and the credit of the company and that of the whole board, that the amalgamation was not sought for the purpose of monopoly or of raising the price of gas. (Oh, oh.) There were two directors of the other companies present, and they also would give the same pledge. They would all pledge themselves that the first thing done after this amalgamation would be to reduce the price of gas. (Oh, oh! and cheers.) He never promised that which was not afterwards performed. He never pledged himself to anything that was not carried out.

A Voice: Yes; but you will do so to knock up the other company.

Mr. Beck: Yes; by giving you a purer and a cheaper article. The Chartered Gas Company were said to have monopolized the supply of gas to the parish of St. James's, and that it was only an after-thought to supply cannel coal gas when a new company came in. That was not so. Four years ago the company entered into a contract with the Houses of Parliament to supply them with cannel coal gas, but from a report made by Professor Playfair to the effect that it would spoil the ornamental roof, the contract was broken off. The company were ready to supply cannel coal gas to the parish of St. James's if they wished to have it. Much, however, as had been said about its superiority, it was curious to know that out of the twenty-four clubs in the parish only one would have it. He did not say that cannel coal gas was not better, but they would think him a bad tradesman if he did not give to his customers whatever kind they preferred. With respect to monopoly, it was impossible that a concern requiring a capital of £500,000 could be otherwise. The connection of the Chartered Gas Company with the parish of St. James began in 1819; gas was then 15s. a thousand. A contract was entered into for fourteen years, and for five years for the public lights. The contract for the public lights was afterwards extended to ten years, and, as the Equitable was coming into competition, the charge was reduced from £5. 5s. to £3. 10s., on the condition that another company was not let in. The parish had the gas on those terms for the seven following years. The Equitable pipes were then laid. In 1840 the contract was renewed for seven years at £5 a light; and at the end of that period a fresh contract was made for seven years more at £4. 10s. per light. Although that contract bound the company till 1854, the parishioners had the option of putting an end to it in six months, such faith had the company in the parishioners. (Hear, hear.) Last year the parishioners asked for a reduction, and the company lowered the price, notwithstanding the agreement, to £4. 4s., and were laughed at for their liberality. (No, no.) Yes; was it not made a joke of that the directors went out of the board-room minus half-a-guinea. (Cheers.) On the 22nd of January the Paving Board asked for a reduction of price, and it was lowered from £4. 10s. to £4. 4s., and to the parishioners from 6s. to 5s. at Lady-day. Mr. Bidgood himself then stated that the company had acted liberally. ("No," from Mr. Bidgood.) The directors were charged with receiving the deputation discourteously. That was not so. The only discourtesy they were guilty of was in stating the disagreeable truth that no further reduction could be made. The directors received a letter, dated Sept. 25, from the deputation, stating that the matter was under consideration, and that a proposition from the Western Company, offering a considerable reduction, was also under consideration. The company never heard a word from them again. This was not very courteous on the part of customers to those who had served them so well for thirty years. (Hear, hear). The gas they had in the room where they were then assembled was the finest that could be made. So desirous were the company to satisfy their customers, that they gave them ten per cent. of cannel coal at an immense expense, in order that there might be no complaints. The company had done everything in their power to give complete satisfaction, and now they were found fault with because they wanted to have it in their power to make further reductions by carrying on the business with one staff instead of three. (Cheers.)

Mr. Cochrane would express no opinion either way, but hoped the parishioners would endeavour to furnish themselves not only with their own gas, but also their water.

After a few remarks from Mr. Gabriel a committee, with power to add to their number, was appointed to carry out the resolutions of the meeting.

The thanks of the meeting were then voted to the senior churchwarden for presiding, and the proceedings, which were throughout of a very boisterous character, terminated at half-past 10, not, however, without some strong observations from the minority upon, the one-sided conduct of the chairman.

MARYLEBONE VESTRY, Dec. 21, 1850.

A deputation, consisting of Mr. Hawes, sen., Mr. Deffell, and Mr. Burls, from the Chartered Gas Company, waited on the vestry in reference to a motion they understood was coming on for the admission of the Western Gas Light Company into Marylebone, and to state that as a union was contemplated between the Chartered, the Equitable, and the London Gas Companies, and as the mains of those companies were already through Oxford-street and other principal thoroughfares, they were prepared to supply the cannel coal gas at twenty per cent. cheaper than at present, and that without in any way disturbing the pavement of the public thoroughfares. In answer to a question by Mr. Glasier as to the accuracy of certain printed statements asserting the superiority of the Western over the Chartered gas in illuminating power, Mr. Hawes stated that the assertions in the printed statement in question were false. The deputation were informed that the motion to which they referred would not come before the vestry till the first week in January, and then the vestry would be happy to hear the proposals of the deputation.

January 4, 1851.

Communications were read from the Western Gas Company stating that that company had been scandalized and unscrupulously assailed by the denial of Mr. B. Hawes, sen., who attended with a deputation from the Chartered Gas Company, in declaring that a printed report of the result of certain experiments, testing the superiority of the Western Gas over the Chartered, was false. In support of the fact that such statements showing the superiority of the Western gas were true, a certificate was also forwarded to the vestry from four members of the St. James's Paving Committee before whom such experiments were made.—*Observer.*

TABLE OF THE PRICES OF GAS

at from 1s. to 14s. per 1000 cubic feet English, reduced into French prices and measure at the exchange of 25f. 50c. per pound sterling.

s.	d.		f. c.			centimes.	
1	0	or	1.27	per 1000 cubic ft.	English is	4.485	per cubic meter.
1	3	,,	1.58¾	,,	,,	5.606	,,
1	6	,,	1.90½	,,	,,	6.727	,,
1	9	,,	2.22¼	,,	,,	7.848	,,
2	0	,,	2.54	,,	,,	8.970	,,
2	3	,,	2.85¾	,,	,,	10.090	,,
2	6	,,	3.17½	,,	,,	11.212	,,
2	9	,,	3.49¼	,,	,,	12.333	,,
3	0	,,	3.81	,,	,,	13.455	,,
3	3	,,	4.12¾	,,	,,	14.576	,,
3	6	,,	4.44½	,,	,,	15.697	,,
3	9	,,	4.76¼	,,	,,	16.818	,,
4	0	,,	5.08	,,	,,	17.940	,,
4	3	,,	5.39¾	,,	,,	19.061	,,
4	6	,,	5.71½	,,	,,	20.182	,,
4	9	,,	6.03¼	,,	,,	21.403	,,
5	0	,,	6 35	,,	,,	22.425	,,
5	3	,,	6.66¾	,,	,,	23.546	,,
5	6	,,	6.98½	,,	,,	24.667	,,
5	9	,,	7.30¼	,,	,,	25.788	,,
6	0	,,	7.62	,,	,,	26.910	,,
6	3	,,	7.93¾	,,	,,	28.031	,,
6	6	,,	8.25½	,,	,,	29.152	,,
6	9	,,	8.57¼	,,	,,	30.273	,,
7	0	,,	8.89	,,	,,	31.395	,,
7	3	,,	9.20¾	,,	,,	32.516	,,
7	6	,,	9.52½	,,	,,	33.637	,,
7	9	,,	9.84¼	,,	,,	34.758	,,
8	0	,,	10.16	,,	,,	35.880	,,
8	3	,,	10.47¾	,,	,,	37.001	,,
8	6	,,	10.79½	,,	,,	38.122	,,
8	9	,,	11.11¼	,,	,,	39.243	,,
9	0	,,	11.43	,,	,,	40.365	,,
9	3	,,	11.74¾	,,	,,	41.486	,,
9	6	,,	12.06½	,,	,,	42.607	,,
9	9	,,	12.38¼	,,	,,	43.728	,,
10	0	,,	12.70	,,	,,	44.850	,,
10	3	,,	13 01¾	,,	,,	45.971	,,
10	6	,,	13.33½	,,	,,	47.092	,,
10	9	,,	13.65¼	,,	,,	48.213	,,
11	0	,,	13.97	,,	,,	49.335	,,
11	3	,,	14.28¾	,,	,,	50.450	,,
11	6	,,	14.60½	,,	,,	51.577	,,
11	9	,,	14.92¼	,,	,,	52.698	,,
12	0	,,	15.24	,,	,,	53.820	,,
12	3	,,	15.55¾	,,	,,	54.940	,,
12	6	,,	15.87½	,,	,,	56.062	,,
12	9	,,	16.19¼	,,	,,	57.183	,,
13	0	,,	16.51	,,	,,	58.305	,,
13	3	,,	16.82¾	,,	,,	59.426	,,
13	6	,,	17.14½	,,	,,	60.547	,,
13	9	,,	17.46¼	,,	,,	61.668	,,
14	0	,,	17.78	,,	,,	62.790	,,

Great Central Gas Consumers' Company.—The directors of this company have issued a reply to Mr. T. Tyrrell's letter of Nov. 26th (inserted in our last), the only important portions of which are the following answers to the eight questions put by Mr. Tyrrell:—"1. The amount of leakage has been ascertained by actual admeasurement, and it is considerably less than 1-6th. 2 and 3. Mr. Croll has contracted to be supplied with from 30,000 to 50,000 tons of coals per annum for three years, all expenses included, for considerably less than his estimates; and although, until the works are connected by a siding with the Eastern Counties Railway, so as to extend his market for coke, his sale at the works produces something less than the estimated price, yet the quantity used in carbonizing is so much less than the estimated amount as to make up the deficiency in price. 4. Upwards of 4000 consumers are already supplied, and the remaining 2000 will be served as soon as the fitters can connect the services. 5. Messrs. Rigbys have not quite completed their contract, but the few things that remain unfinished will be executed in the course of a few days. 6 and 7. Mr. Croll's patented process, both as to retorts and purifying, are completely successful. 8. The gas

supplied by the company is equal in illuminating power to that which *is* and greater than that which before the formation of this company *was* supplied by the old companies; and it contains less ammonia, less sulphur, and no sulphuret of carbon, which theirs *does* contain." Some doubt is thrown over the exactitude of these statements by the rumour that, though *every bench of retorts upon the premises* (equal to about 460 12½-inch D's, 7 ft. 6 long) has been heated during the late long nights, yet that the quantity of gas sold during the last quarter does not give promise of a revenue of much more than one half of that calculated upon. As to the coke, every passenger on the adjoining railway can satisfy himself that if the accumulation of stock goes on in the same proportion as it has done during the last few weeks, some additional acres of land must be enclosed from the common for its reception, almost every available corner of the present ground being now occupied by its crumbling mountains. It must, therefore, be either unsaleable at the price asked, or meet with such competition from establishments nearer the markets for its consumption, as will materially affect the calculations upon which the contract for manufacturing gas at 1s. 4½d. per 1000 feet was founded.

French Academy of Sciences.—Two prizes, of 500 f. each, for *Improvements in the Insalubrious Arts*, have been awarded—one to M. Mallet, and the other to M. Cavaillon, for different processes for the purification of gas. The following is an extract from the report made on this subject by the commission, composed of MM. Rayer, Chevreul, Regnault, Boussingault, and Payen:—"Since the year 1841, when M. Dumas made a favourable report to the Academy on the process of M. Mallet, various commissions, which had been appointed to award the Montyon prizes, have examined the working of this process. Analogous results were pointed out by the several reporters of these commissions, but, before awarding any prizes, it was thought better to wait until the application of the process in several large establishments should have demonstrated its superiority as incontestable. The commission considers that the time is now arrived for granting M. Mallet a prize, which they accordingly award him. M. Mallet's process is in use at the works of Roubaix and Turcoing, St. Quentin, St. Denis, and Douai, in France; at Brussels, Bruges, and Courtrai, in Belgium. M. Mallet's process consists in the employment of metallic solutions, especially that of chloride of manganese, the residue of the manufacture of chlorine*. This solution, saturated with some hundredths of ammoniacal gas liquor, is placed in the purifying vessels, arranged in three separate stages, so that the solution runs from one to the other, whilst the gas traverses in a contrary direction. This methodical washing of the gas arrests the carbonic acid, the sulphuretted hydrogen, and the ammonia contained in the impure gas; carbonate and sulphuret of maganese are precipitated, and muriate of ammonia remains in solution. The precipitates are kept in suspension in the three vessels by means of mechanical agitation; it is from the last of the three vessels that the muddy liquid, charged with the impurities of the gas, is withdrawn; the liquid is then run into settling backs, and the clear solution of muriate of ammonia drawn off, evaporated, and crystallized. The deposit, roasted in a reverberatory furnace, gives a mixture of oxide and sulphate of manganese. As the gas which has undergone this operation still retains a portion of sulphuretted hydrogen, it is passed through dry lime purifiers in the usual way, and is then ready for use. M. Mallet's process, by removing the whole of the sulphuretted hydrogen, removes one of the principal causes of the disagreeable odour of gas, and prevents the formation of sulphurous acid, which renders unwholesome the air of apartments in which gas is burnt; and also diminishes the inconveniences arising from the tarnishing effect which sulphuretted hydrogen and sulphurous acid gas have on plate, paintings in which white lead is used, and steel and iron articles in common use. The purification of gas thus performed also enables us to collect the ammoniacal salts. Each ton of coal furnishes enough ammonia to produce at least thirteen lbs. of sal ammoniac; the gas works at Roubaix and Turcoing, St. Quentin, St. Denis, and Douai, furnish annually 66 tons of that product, and proportionate quantities are obtained at the Belgian gas works. M. Cavaillon obtains the same useful results by another means. After numerous experiments he has succeeded in determining the conditions most favourable, in an economical point of view, to the action of sulphate of lime on the carbonate of ammonia contained in coal gas; he has also been enabled to reunite these conditions by such simple and yet efficacious means that he can accomplish the purification of the gas without making any alteration in the purifiers ordinarily employed in gas works, and without causing any extra pressure on the pipes and retorts. The material employed by M. Cavaillon is the old plaster of paris obtained from houses which have been demolished. (Plaster of paris is extensively employed in the construction of houses in Paris, and other parts of France.) This refuse plaster, which is composed of sulphate of lime and carbonate of lime (formed by the action of the carbonic acid of the air on the sulphate), is first ground into a coarse powder, then moistened slightly with water and dilute sulphuric acid, with the view of converting the carbonate of lime into sulphate; and, lastly, mixed with the breeze or small particles of coke, to render it more permeable to gas. The sulphate of lime thus prepared is placed on trays or shelves in the ordinary purifiers, the gas traversing this material gives up its carbonate of ammonia to the sulphate of lime, by which means carbonate of lime and sulphate of ammonia are formed. The gas then passes into the ordinary dry lime purifiers, where the sulphuretted hydrogen is abstracted by the lime—this latter process being more completely accomplished, on account of the previous removal of the ammonia, than it would be if the ammonia had not been previously removed. The gas works of the Faubourg Poissonière and of Vaugirard, and of MM. Dubochet, Pauwels, and Co., of Paris, all adopt this process of M. Cavaillon. The quantity of sulphate of ammonia obtained annually at these three works amounts to 200 tons."

* This is evidently the process which in the evidence given upon the Great Central Gas Consumers' Bill was mentioned as a recent discovery. We were not aware till we read the above report that the process had been in use on the Continent previous to 1841.

Indiarubber Gasholders.—Mr. J. L. Hancock has just completed four portable gasholders destined for the city of Mexico which are in several respects worthy of notice. As no workmen are to be found in the capital of Montezuma capable of putting an ordinary sheet-iron gasholder together, and as the cost of sending out competent men from this country for such a purpose would have amounted to a large sum, it was suggested that a substitute for iron might be found in canvas rendered impermeable to gas by indiarubber, and Mr. Hancock's experience was called in to aid the carrying out of the suggestion. The vessels made by him are cylindrical bags, 12 feet diameter and 15 feet high, formed of a double thickness of strong canvas, stuck together with a solution of indiarubber. Rings of three-eighth inch round iron are introduced in the sides at intervals of about a foot, so as to keep them in their circular shape, and the whole when packed represents a disc of 12 feet in diameter by a few inches in thickness, in which form they are intended to be transported to their destination. The cost of each gasholder complete is £55, or about 8d. for each cubic foot of its contents, a sum considerably less than the cost of a tank and gasholder of this dimension, and of the usual construction, in this country.

Clay Retorts.—There are now at work at the South Metropolitan Gas Works, Old Kent-road, two benches with five clay retorts in each, which have been uninterruptedly in action for upwards of seventeen months. They are D shaped, 20 inches wide by 12½ inches high and 7 feet 6 long, and are calculated to have produced, up to the present time, at least 1,800,000 feet of gas per retort, with an expenditure of fuel *not exceeding* that of the iron retorts used on the same station; and there is every prospect of each retort making upwards of two million feet of gas before it is worn out. These excellent specimens of clay retorts are made in one piece, and were manufactured by Messrs. Joseph Cowen and Co., of Blaydon Burn, near Newcastle-on-Tyne, on their patented system.

Hydraulic Mortar.—Few engineers or architects who have visited Liverpool will have neglected to examine the docks, constructed under the direction of Mr. Hartley, and, if they have noticed the character of the recent work, they will have observed that the river walls, entrances, and dock walls are principally of rubble masonry, a mode of building often adopted for the tanks of gasholders. The strength of this work in a great measure depends upon the good quality of the mortar used. From inquiries we obtained the following particulars as to the mortar, which may be useful to some of our readers. The dock works at Birkenhead are constructed with similar mortar. In fact it has been made principally by men from the Liverpool works. The stone is obtained from Halkin mountain, near to Holywell, Flintshire, North Wales; it is shipped in the river Dee. Price of stone delivered upon the quay at Liverpool per ton, 7s. 3d. When it is requisite to burn the stone quickly, coke is used, at per ton 16s. When not required quickly, coal is used, at per ton 8s. 6d. The stone can be burned quickly for as little money with coke as it can be burned slowly with coals. But it is very expensive to burn quickly with coals or slowly with coke. The proportion of coke is generally one bushel to six bushels of stone.

Cost of Burning the Limestone.

Tons.	Cwt.	Per Ton.	£	s.	d.
4	10	of limestone, 7s. 3d.	£1	12	7½
—		labour on do. 1s. 6d.	0	6	9
1	10	of coke .. 11s. 0d.	0	16	6
			£2	15	10½
Produce: Lime, 3 tons, at 18s. 7½d. per ton ..			£2	15	10½

Mortar from the mill costs, per cubic yard, from 9s. 6d. to 10s. 6d. Various quantities of sand are used, from two to five, to one of lime by measure. Smiths' ashes, or furnace ashes, are used to mix with the lime, and with much advantage. The sand is obtained out of the river Mersey, generally from the great banks above the town. The limekilns stand close to the mortar-shed; the lime is drawn fresh from the kiln mouth, is slaked, and thrown at once into the mortar-pans (which are driven by steam power). The mortar is used fresh, generally on the day it is made. It sets rapidly, and in a few months the rubble becomes one solid mass. Grout is used plentifully, made from the same mortar.

Naphtha Lamps.—These appear to be most dangerous articles. Of late we scarcely ever look over the news of a week without seeing some account of an accident from their use. In last month's papers we perceive no less than four such cases. In one at Seacombe, while a teacher was filling a naphtha lamp, the naphtha ran over, and, coming in contact with a candle held by a boy, took fire, and the whole exploded, driving out a partition wall twelve feet long and nine feet high, and setting fire to the house. The teacher and several of his scholars were severely burnt, and one of the latter has since died from the injuries sustained. In another case nearly the same thing happened at Manchester, so far as regarded the replenishment, the explosion from contact with a light held by a boy while a man poured out the naphtha, and the death of the boy. In Oldham and Bolton two cases nearly identical in every respect occurred, in which two stall women were severely burnt. We observe the occasional occurrence of the very same sort of casualties detailed in the American newspapers. It is easy to say that carelessness or ignorance of the proper mode of dealing with so dangerous an agent is the usual cause of such accidents. Were naphtha even only a little less imminently dangerous, time might be allowed the public to acquire an adequate knowledge of the way to manage it; but, as it is, they are purchasing that knowledge at rather too great an expense, and we think it a duty to warn all and sundry against tampering with so dangerous an agent.

Share List.

THE PRICES QUOTED ARE THOSE AT WHICH THE LAST SALES HAVE BEEN MADE.

The Companies whose names are printed in italic type are incorporated by Act of Parliament.

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£	**ENGLAND.**	£ s. d	£ s. d	£ s. d
		Aberdare			
		Abergavenny			
		Aberystwith			
		Abingdon			
		Accrington £7,000		5 0 0	
		Alcester			
		Alford, Lincolnsh.			
		Alfreton			
		Alnwick			
		Alston Moor			
250	10	Alton	10 0 0	5 0 0	10 0 0
800	5	Altrincham	5 0 0		
		Amlwch			
160	10	Ampthill	10 0 0	5 0 0	10 0 0
350	10	Andover	10 0 0	6 0 0	11 0 0
		Appleby			
		Arundel			
		Ashbourn, Derby			
		Ashburton			
		Ashby-de-la-Zouch			
		Ashford, Kent			
		Ashton-under-Line £30,700		10 0 0	
		Atherstone			
		Axminster			
225	20	Aylesbury	20 0 0	5 0 0	21 0 0
		Aylsham, Norfolk			
		Bacup, Yorkshire			
		Bakewell			
		Baldock			
140	25	Banbury	25 0 0		
		Bangor			
500	5	Barking, Essex	4 10 0	5 11 0	5 0 0
250	10	Barnard Castle	10 0 0	5 10 0	10 15 0
		Barnet			
		Barnsley £6000		7 10 0	
100	20	Barnstaple	20 0 0	7 10 0	25 0 0
		Barton			
120	25	Basingstoke	25 0 0	8 0 0	28 0 0
2400	20	*Bath*	16 0 0	6 0 0	25 to 30
		Battle £800		6 0 0	
56	26½	Bawtry	26 10 0	5 0 0	25 0 0
		Beaumaris			
		Beccles, Bungay, and Lowestoft			
		Bedford			
		Bedworth			
		Belford			
		Bedale, Yorkshire			
		Belper			
		Beminster			
		Berkhempstead			
700	5½	Berwick-on-Tweed	5 10 0	6 8 0	5 15 0
		Beverley			
		Bewdley			
280	10	Bideford	10 0 0	6 0 0	10 10 0
		Biggleswade			
160	10	Bicester	10 0 0	5 0 0	10 0 0
		Bilston £15,100		6 10 0	
		Billericay			
		Bingley £7400		4 0 0	
		Birkenhead and Claughton £70,000	35 0 0	3 0 0	32 to 34
2400	50	*Birmingham and Staffordshire*	50 0 0	8 0 0	84 to 86
	25	*Ditto*, new shares	7 10 0	8 0 0	12 0 0
704	75	*Birmingham*	75 0 0	9 0 0	128 to 130
		Bishop's Auckland			
		Bishop's Stortford			
		Blackburn £30,000		10 0 0	
		Blandford			
		Blythe			
		Bodmin			
		Bognor			
		Bolton £38,582		9 19 5	
		Boroughbridge			
		Boston £8000		10 0 0	
200	10	Bourn	10 0 0	5 0 0	
		Brackley			
		Bradford, Wilts			
		Bradford, Yorksh. £45,000		9 10 0	
		Brampton, Cumb.			
		Brandon, Suffolk			
		Brecon			
		Bridge-end, Glam.			
		Brierly Hill			
2250	20	*Brighton*	20 0 0	5 0 0	14 to 15
1125	20	,, new shares	16 0 0	5 0 0	
		Brighton and Hove £50,276			
4250	20	*Bristol*	20 0 0	9 0 0	37 0 0
1725	25	*Bristol and Clifton*	25 0 0	6 0 0	25 0 0
		Brixham			
		Braintree			
750	50	*Brentford*	50 0 0	6 0 0	44 to 46
800	25	,, new shares	11 0 0	6 0 0	11 0 0
		Brentwood			
		Bridgwater £6000		5 0 0	
400	10	Bridlington	10 0 0	5 0 0	10 0 0
		Bridport			
		Brigg			
100	50	Bromley, Kent	50 0 0	6 0 0	52 10 0
		Bromsgrove			
		Broughton			
120	10	Bruton	10 0 0	4 0 0	8 0 0
100	25	Buckingham	25 0 0	5 0 0	25 0 0
		Bungay (see Beccles)			
		Burford			
		Burnley £19,946		4 10 2	
		Burslem			
		Burton-on-Trent			
		Bury St. Edmund's £10,500		5 0 0	
		Bury, Lanc. £6570			
		Buxton			
		Callington			
		Calne, Wilts			
		Camborne			
		Cambridge £34,560		9 0 0	
240	50	*Canterbury* Gas and Water	50 0 0	6 0 0	57 to 58
240	25	*Ditto*, second issue	25 0 0	6 0 0	28 to 29
		Cardiff £12,000		7 10 0	
		Carmarthen			
		Chapel on the Frith			
		Chard			
		Chatham (see Rochester)			
		Chatteris			
		Cheadle			
		Chelmsford			
		Cheltenham £18,732		8 10 0	
		Chepstow			
		Chertsey			
230	10	Chesham, Bucks	10 0 0		
		Chester			
		Chester-le-Street			
		Chesterfield £13,125		4 17 6	
240	25	Chichester	25 0 0	6 0 0	30 0 0
		Chippenham			
		Chipping Norton			
		Chirk			
		Chorley			
		Chudleigh			
		Cirencester			
		Clifton (Bristol and Clifton)			
		Cleckheaton, York.			
		Clitheroe			
		Cockermouth			
		Colchester			
		Collumpton			
		Colne, Lancashire			
		Coleford, Gloucest.			
		Coggeshall			
		Congleton £5000		5 0 0	
		Cowbridge			
800	25	*Coventry*	25 0 0	6 0 0	20 0 0
		Cowes			
		Crewkerne			
		Croydon ... £20,000		5 0 0	
		Cranbrook ... £1900		5 0 0	
		Crediton			
		Crewe, Cheshire			
		Cricklade			
		Darlaston			
		Darlington			
250	20	Dartford	20 0 0	7 10 0	27 0 0
		Dartmouth			
125	20	Daventry	20 0 0	6 0 0	21 8 0
		Dawley, Shrop.			
		Dawlish			
500	6	Denbigh	6 0 0	5 0 0	6 0 0
820	10	Deptford	10 0 0	5 0 0	4 10 0
325	50	*Derby*	50 0 0	10 0 0	
90	20	Dereham (East)	20 0 0	4 10 0	
1000	5	*Devonbury*	5 0 0	10 0 0	8 12 6
		Devizes			
400	5	*Devonport*	5 0 0	6 0 0	6 5 0
		Doncaster			
280	25	Dorchester	25 0 0	5 0 0	25 0 0
120	25	Dorking	20 10 0	5 0 0	21 10 0
		Douglas, Isle of M.			
200	56½	*Dover*	56 10 0	4 15 4	55 0 0
		Downham			
		Driffield			
		Droitwich			
600	20	*Dudley*	20 0 0	4 0 0	15 to 16
		Dunmow			
		Dunstable			
		Durham			
276	9	Dursley, Gloster	9 0 0	5 10 0	8 0 0
		East Grinstead			
		Elland			
		Ellesmere			
		Enfield			
360	19	Epsom and Ewell	19 0 0		
		Evesham			
		Exeter £40,000		10 0 0	
		Exmouth			
		Eye, Suffolk			
64	25	Fakenham	25 0 0	5 0 0	25 0 0
		Falmouth			
		Fareham			
120	25	Farnham	25 0 0	10 0 0	42 0 0
		Farringdon			
		Faversham			
		Ferrybridge			
		Fleetwood			
		Folkestone			
		Fowey			
240	5	Framlingham	3 10 0		
		Frome			
		Garstang			
		Gillingham, Dorset			
		Glastonbury			
		Glossop ... £10,000		9 0 0	
		Gloucester £25,000		7 10 0	
		Gomersal			
		Godalming			
		Gosport			
		Grantham			
		Gravesend			
1000	10	*Great Grimsby*	6 10 0	8 0 0	8 5 0
	25	Guildford	25 0 0	4 0 0	20 0 0
		Guisborough			
		Hadleigh			
		Hales Owen			
300	6	Halesworth	6 0 0	7 10 0	5 10 0
		Halifax £15,000		10 0 0	
		Halstead			
		Hampton Court			
		Harrogate £10,000		5 0 0	
		Hartlepool £15,137		7 10 0	
		Haslingden, Lansh.			
330	50	Hastings and St. Leonard's	50 0 0	6 0 0	60 0 0
		Haverfordwest			
		Haverhill			
		Haworth, Yorks.			
		Hayle			
		Helstone			
		Hemel Hempstead			
300	10	Henley-on-Thams.	10 0 0		
		Hereford £5300		4 0 0	
		Herne Bay			
270	10	Hexham	10 0 0	7 0 0	13 0 0
		Heywood £10,000		5 0 0	
		Highworth (Wilts)			
230	10	Hinckley	10 0 0	5 0 0	7 0 0
		Hindley, Lancash.			
		Hitchen			
		Hythe			
		Hoddesden			
		Holbeach			
		Holmfirth £8880		3 10 0	
		Holyhead			
		Holywell (see British Provincial)			
		Honiton			
		Horncastle			
10		Houghton-le-Sprg.	10 0 0	8 0 0	
		Horsham			
		Howden			
		Hull, Sculcoats (see British Provin.)			
		Hull, £11,712. 10s.		5 0 0	
210	10	Hungerford	10 0 0	5 0 0	10 0 0
		Huddersfield			
520	5	High Wycombe	5 0 0		5 0 0
		Ilminster			
		Ilford			
		Ilfracombe			
		Ironbridge			
1400	10	*Ipswich*	10 0 0	7 10 0	15 0 0
1400	10	,, new shares	5 0 0	7 10 0	
800	25	*Isle of Thanet* (Ramsgate&Mar.)	20 0 0	5 0 0	20 to 21
		Kendal £9100		8 15 0	
		Kenilworth			
		Keswick			
		Kettering	25 0 0	5 0 0	25 0 0
100	25	*Kiddermins.* £10000		5 0 0	
		King's Langley			
		Kington, Hereford			
		Kirkby Lonsdale			
		Kirkham, nr. Preston			
		Knutsford			
		Lancaster			
		Llanelly ... £3000		5 0 0	
		Llandovery			
		Leamington Priors £22,500		6 0 0	
		Leatherhead			
		Ledbury			
		Leeds Old Comp. old stk., £60,300		10 0 0	
		new ,, £23,775		6 0 0	
		Leeds New £60,000		10 0 0	
		Leek			
		Leicester ... £35,230		7 0 0	
		Leigh			
125	20	Leighton Buzzard	20 0	5 0 0	
		Leominster			
		Leyburn, Yorksh.			
		Liskeard			
330	25	Lewes	25 0 0	5 0 0	23 0 0
		Lincoln £8000		10 0 0	
		Leyland, Lancash.			
		Littlehampton			
250	20	Lichfield	20 0 0	7 10 0	27 10 0
		Liverpool United	100 0 0	9 0 0	174 to 176
		,, ½ sh.	25 0 0	9 0 0	43½ to 43¾
		Langport			
		London Comps.—			
5000	40	*British*	18 0 0	5 0 0	12 to 13
		,, debentures £46,300		4 0 0	
5000	20	,, Provincial—(Gloucester, Holywell, Hull, Norwich, Stoke, Trowbridg)	20 0 0	7 0 0	16 to 18
	20	,, Prov., new	6 0 0	7 0 0	4 to 5
	25	*Commercial*	25 0 0	6 0 0	22½ to 23¼
	25	,, new shares	15 0 0	6 0 0	1¼ to 1 dis
	25	,, ,,	2 10 0	6 0 0	1¼ to 1 dis
12,000	50	*Chartered*	50 0 0	6 0 0	45 to 47
6000	50	,, new shares	10 0 0	6 0 0	9 to 9½
2000	150	*City of London*	150 0 0	5 0 0	160 0 0
4000	50	*Equitable*	50 0 0	2 10 0	25 to 28
		,, debentures £51,000			
10,000	20	European—(Amiens, Boulogne, Caen, Havre, Nantes, and Rouen)	20 0 0	5 0 0	10 to 12
	20	,, do. new	5 10 0	5 0 0	¾ to 1

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
15,000	10	Gt.Cntl.Consumers	10 0 0		
8000	50	*Impl.Continental* —(Amsterdam, Aix-la-Chapelle Antwerp, Berlin, Bordeaux, Brussels, Cologne, Frankft., Ghent, Haarlem Hanover, Lille, Marseilles, Rotterdam, Toulouse, Vienna)	42 0 0		40 to 45
7000	50	,, new shares	41 0 0		50 to 55
	50	,, third issue	42 10 0		40 to 45
10,000	50	*Imperial*	50 0 0	6 0 0	69 to 71
3000	50	,, new shares	35 0 0	6 0 0	50 to 52
		,, debentures £50,500			
4000	40	*Independent*	40 0 0	6 0 0	46 to 47
8000	25	*London*	25 0 0		7 to 9
6000	25	,, preference	25 0 0	6 0 0	18 to 20
		,, debentures £150,000			
9000	50	*Phœnix*	49 0 0	4 10 0	27 to 29
1600	100	*Ratcliff*	90 0 0	5 0 0	58 to 60
4000	25	*South Metrop.*	25 0 0	6 0 0	22 to 23
9000	50	United General—(Cork, Dublin, Limerick)	50 0 0	2 0 0	15 to 15½
12,500	20	Western	18 0 0		7 0 0
		Lostwithiel			
		Loughborough			
240	25	*Louth*	25 0 0	6 0 0	26 10 0
		Lowestoft (see Beccles)			
611	5	Ludlow Union	5 0 0	6 0 0	5 0 0
		Luton			
		Lutterworth			
		Lyme Regis			
		Lymington			
		Malmesbury			
		Macclesfield 32,000		3 15 0	
		Maidenhead			
250	50	Maidstone	50 0 0	10 0 0	100 0 0
		Maldon			
		Marlborough			
		Malton (New)			
		Malvern			
		Manningtree			
		Mansfield £5000		10 0 0	
		March			
		Margate (see I. of T.			
		Market Deeping			
132	25	Market Harboro'	25 0 0	6 0 0	30 0 0
		Market Raisin			
		Market Weighton			
		Marlow			
370	10	Maryport	10 0 0	6 0 0	12 0 0
		Melksham			
		Melton Mowbray			
		Merthyr Tydvil			
		Mere			
		Middleton £9039		5 0 0	
		Midsummer Norton			
		Middlesboro'			
		Mildenhall			
		Mitcham			
		Mold			
700	10	Monmouth Gas and Water	10 0 0	5 0 0	
		Monk Wearmouth			
		Moreton in Marsh			
		Morley			
		Mottram			
		Nantwich			
		Neath			
		Needham Market			
		Newark £5000		10 0 0	
250	20	Newbury	20 0 0	5 0 0	20 0 0
13,000	5	Newcastle & Gateshead Union	5 0 0	8 0 0	6 12 6
		Newcastle-under-Lyne £6200		4 0 0	
600	5	Newmarket	5 0 0	6 0 0	5 0 0
		Newnham, Glost.			
		Newent			
		New Mills & Hayfield £2115			
		Newport, M. £11720		8 0 0	
320	50	*Newport, Isle of W.*	38 0 0	4 0 0	19 to 20
		Newport Pagnell			
		Newport, Salop			
		Newton Abbot			
		Newton, Lanc.			
		Northallerton			
		North Walsham			
542	20	*Northampton*	18 0 0	10 0 0	27 0 0
		Northwich			
		Norwich (see British Pro. £40,000		7 0 0	
900	50	*Nottingham*	50 0 0	10 0 0	
900	50	New shares		10 0 0	
		Nuneaton			
		Oakham			
		Oakhampton			
200	10	Odiham, Hants	10 0 0	3 10 0	10 0 0
		Oldham			
		Ongar			
		Ormskirk			
		Otley, Yorkshire			
		Oundle			
		Oxford £18,000		9 10 0	
		Over Darwen £8000		5 0 0	
		Padstow			
		Pately Bridge, Yrk.			
250	20	Penrith	15 0 0	6 10 0	21 0 0
		Penryn			
		Penzance			
200	10	Petworth	10 0 0	9 10 0	12 0 0
		Pickering			
3000	10	*Plymouth & Stonehouse*	10 0 0	6 0 0	11 0 0
		Pocklington			
		Pontefract			
		Pontypridd			
400	10	Poole	10 0 0	5 0 0	10 0 0
		Port Madoc			
600	50	*Portsea Island*	53 0 0	5 0 0	45 to 47
400	10	Prescott	9 0 0	4 13 4	7 0 0
		Preston £52,500		10 0 0	
		Pwllheli			
		Pontypool			
		Pudsey £12,000		5 0 0	
		Radcliff and Pilkington £9000		4 12 10	
		Ramsay, I. of Man			
		Ramsgate (see Isle of Thanet)			
		Ravenglass			
1000	10	*Reading*	10 0 0	3 0 0	7 0 0
500	20	*Reading Union*	20 0 0	6 0 0	17 0 0
		Redditch			
		Redruth			
		Reigate			
		Retford (East)			
		Rhyl			
		Richmond (Surrey)			
		Ripon			
		Rochester and Chatham £20,000		6 0 0	
		Rochford			
		Rockingham			
		Romford			
		Ross			
		Rotherham £6100		10 0 0	
		Royston			
		Ruabon			
		Rugby			
		Rugeley			
		Ruthin			
		Runcorn ... £11,000		7 10 0	
500	10	Ryde	10 0 0	6 0 0	12 0 0
		Rye			
		Romsey			
		Saddleworth			
225	20	Saffron Walden	20 0 0	3 15 0	19 0 0
		St. Austel			
		St. Asaph			
		St. Colomb			
		St. Helen's £7500		7 10 0	
		St. Helier's (Jersey)			
		St. Ives, Hunting.			
		St. Ives, Cornwall			
250	10	St. Neot's	10 0 0	8 0 0	12 0 0
		St. Peter's Port, (Guernsey)			
320	25	Salisbury	25 0 0	6 0 0	28 to 30
		Sandbach			
140	10	Saxmundham	10 0 0	5 0 0	10 0 0
		Scarborough			
		Seaham Harbour			
		Selby			
		Settle			
290	10	Sevenoaks	10 0 0	5 0 0	10 0 0
		Shaftesbury			
5400	25	*Sheffield United*	24 0 0	8 6 8	32 0 0
		Shelton, Potteries (see Brit. Prov.)			
		Shepton Mallet			
		Sherborne			
2914	5	Shields, North (Tynemouth)	5 0 0	3 0 0	5 0 0
		Shields (South)			
		Shiffnal, Salop			
1000	5	*Shipley*	5 0 0	6 0 0	5 10 0
		Shipston-on-Stour			
		Shoreham			
		Shrewsbury £10,000		7 0 0	
400	10	Skipton	10 0 0	4 0 0	11 0 0
		Sleaford			
250	10	Slough	10 0 0		
		Snaith			
		Soham			
		Southwold			
		South Molton			
1000	50	*Southampton*	32 0 0	5 0 0	
		Sowerby, Yorksh.			
		Stretford			
		Stokesly			
		Stafford £10,000		5 0 0	
		Staines and Egham			
		Staley Bridge £15,000		10 0 0	
		Stamford £11,250		3 0 0	
		Stockton-on-Tees £7980		9 5 0	
840	9½	Stockton, New	9 10 0	9 0 0	8 0 0
960	10	Stoke-upon-Trent	10 0 0	5 10 0	10 0 0
500	10	,, new shares	4 0 0	5 10 0	10 0 0
		Stone, Stafford			
		Stoney Stratford			
		Stourbridge			
		Stowmarket			
150	20	Stratford-on-Avon	20 0 0	7 10 0	30 0 0
		Stroud			
169	10	Swaffham	10 0 0	5 0 0	5 10 0
		Swansea £9000			
		Sudbury			
		Sunderland, old			
6400	5	*Sunderland*, new	5 0 0		
		Sutton			
		Swindon			
2800	5	*Taunton*	5 0 0	None	2 10 0
		Tadcaster			
		Tamworth			
		Tavistock			
		Teignmouth			
		Tenbury			
		Tenby			
		Tenterden £2000		2 10 0	
		Tetbury, Gloster			
		Tewkesbury			
		Thame			
		Thetford			
		Thirsk			
		Thornbury			
		Thorne			
		Tiverton			
670	5	Todmorden	3 0 6		
		Torquay			
		Torrington, Devon			
		Totnes			
		Totnes and Bridgetown Consumers			
4000	5	Tottenham	3 10 0	6 0 0	3 0 0
		Towcester			
		Tring			
		Trowbridge (see British Provin.)			
75	50	Truro	50 0 0	2 0 0	
		Tunbridge			
		Tunbridge Wells			
		Ulverston			
		Uppingham			
210	5	Upton-on-Severn	5 0 0	5 0 0	5 0 0
		Usk, Monmouth			
		Uttoxeter			
		Uxbridge			
1000	25	*Wakefield*, old capl	25 0 0	6 0 0	25 0 0
1600	5	,, new ,,	5 0 0	6 0 0	5 0 0
300	10	Wallingford	10 0 0	5 0 0	8 0 0
		Wandsworth			
		Wantage			
		Warrington £23304		10 0 0	
100	10	Wareham	10 0 0	3 10 0	8 0 0
120	25	Warminster	25 0 0	5 0 0	27 0 0
		Warth			
		Warwick £15,000		6 0 0	
		Watford			
		Welchpool, Mntgy.			
		Wellingborough			
		Wellington, Salop			
		Wellington, Smrst.			
		Wells, Smrst. £5000		7 10 0	
		Westbury			
2000	5	Weston-sup.-Mare	5 0 0	6 0 0	5 0 0
		West Ham			
		Whitby			
		Whitehaven			
		Whitstable			
		Whittlesea			
		Wigan £10,160		12 10 0	
		Willenhall			
		Winchelsea			
		Winslow			
240	10	Wimborne Minster	10 0 0		
		Wincanton			
360	50	Winchester	50 0 0	6 0 0	
900	12½	Windsor	12 10 0	10 0 0	23 0 0
		Witham			
		Witney			
4448	10	*Wolverhampton*	10 0 0	7 0 0	15 0 0
		Woburn			
210	10	Wokingham	10 0 0		10 0 0
		Woodbridge			
		Wooler			
		Wotton-un.-Edge			
		Worcester £29,000		8 0 0	
		Workington			
		Worksop and Radford			
		Wirksworth			
		Worthing			
		Wrexham			
		Woolwich			
		Woolwich Consms.			
		Woolwich (North)			
		Wymondham			
		Yarm			
795	20	Yarmouth	20 0 0		15½ to 16½
		Yeadon, near Leeds			
		Yeovil			
		York Untd. £55,000		7 0 0	
		SCOTLAND.			
		Aberdeen			
		Airdrie			
		Alloa			
		Annan			
		Anstruther			
		Ardrossan			
550	20	Arbroath	20 0 0	7 10 0	7 10 0
		Auchterarder			
750	2	Auchtermuchty	2 0 0	6 0 0	2 10 0
		Ayr, old			
		Ditto, new			
		Banff			
		Barrhead			
		Bathgate			
		Beith			
		Bervie			
		Biggar			
		Blairgowrie			
300	6	Borrowstowness	6 0 0	5 0 0	8 0 0
		Brechin			
		Bridge of Allan			
		Broughty Ferry			
		Burntisland			
		Callen			
		Campbelton			
		Clackmannan			
		Coatbridge			
		Coldstream			
		Collinsburgh			
		Crieff			
		Crail, Fife			
		Cumbernauld			
		Cumnock			
600	5	Cupar Angus	5 0 0	6 0 0	5 10 0
250	10	Cupar Fife	10 0 0	7 10 0	14 0 0
		Dalkeith			
		Dingwall			
		Dornoch			
		Douglas			
		Dumbarton			
400	20	Dumfries	14 0 0	5 0 0	20 0 0
		Dunbar			
		Dunblane			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Dundee, old £29,687		4 4 0	
		„ new £33,851		2 10 0	
860	10	Dunfermline	10 0 0	6 0 0	12 12 0
		Dunkeld			
		Dunse			
		Dysart			
6000	25	*Edinburgh Gas Co.*	25 0 0	10 0 0	45 0 0
		„ *and Leith Co.* £98,640		6 10 0	
		Elie			
		Elgin			
		Falkirk, old			
		„ new			
		Falkland			
		Ferry Port on Craig			
		Fochabers			
		Forfar			
		Fort William			
		Fraserburgh			
		Galashiels			
		Garlieston			
		Gatehouse n. Fleet			
		Girvan			
		Glasgow £122,500		7 10 0	
15000	10	*Glasgow City and Suburban*	9 0 0	6 10 0	9 0 0
		Grangemouth			
		Haddington			
		Hamilton £7500		8 0 0	
		Hawick			
		Helensburgh			
		Huntly			
		Inverary			
400	1	Inverkeithing	1 0 0	5 0 0	1 0 0
1200	10	*Inverness Gas and Water*	10 0 0	5 10 0	15 0 0
2400	5	„ new shares	1 5 0	5 10 0	2 5 0
		Irvine			
		Jedburgh			
		Johnstone, near Paisley			
		Keith			
		Kelso			
		Kilmarnock			
		Kincardine			
		Kinghorn			
		Kingskittle, Fife			
		Kinross			
		Kirkaldy			
320	5	Kirkcudbright	5 0 0	5 0 0	5 0 0
1000	3	Kirkintulloch, near Glasgow	3 0 0	5 0 0	3 0 0
227	5	Kirkwall	5 0 0	5 0 0	4 10 0
518	5	Kirriemuir	5 0 0	6 0 0	
		Lanark			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Largo, near Leven			
		Largs			
		Lasswade, n. Edin.			
		Lauder			
		Leith			
		Leslie, Fife			
		Lesmahago			
		Leven			
		Linlithgow			
		Linton, n. Nobleh.			
		Lochee, n. Dundee			
		Lochgilphead			
		Lochwinnock, near Paisley			
1200	1	Markinch	1 0 0	7 10 0	1 5 0
		Mauchline			
		Maxwell-town, n. Dumfries			
		Maybole, Ayrshire			
		Maryhill, near Glasgow			
		Melrose			
718	2	Mid & East Calder	2 0 0		2 0 0
192	5	Moffat	5 0 0		
	13½	Montrose	13 10 0	7 11 1	
		Musselburgh			
		Nairn			
		Neilston, n. Glasg.			
		Newmills, near Kilmarnock			
		Newburgh, Fife			
		Newton Stewart			
		North Berwick, n. Haddington			
		North Queensferry			
		Oban			
		Peebles			
800	25	Perth	25 0 0	1 4 0	22 10 0
		Peterhead			
		Pittenweem			
		Pollokshaws, near Glasgow			
		Port Glasgow			
		Portobello, near Edinburgh			
		Prestonpans			
		Rutherglen, near Glasgow			
		Renfrew, n. Paisley			
		Saltcoats			
		Sanquhar			
		Selkirk			
		South Queensferry			
		St. Andrew's			
		Stewarton			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Stirling			
		Stoneheavn			
		Stonhouse, Lanrks.			
		Stornoway			
		Stranraer			
		Strathaven, near Hamilton			
		Thurso			
		Tillicoultry, n. Alloa			
800	1	Tranent	1 0 0		1 0 0
		Troon			
		Wick			
		Wigton			
		Wemyss	4 10 0		
		IRELAND.			
300	10	Armagh	10 0 0	8 0 0	14 10 0
		Ballinasloe			
700	50	*Belfast*	50 0 0		
		Ballymena			
		Ballymoney			
		Carrick-on-Suir			
		Carrickfergus			
		Carlow, new			
		Cork (see United General)			
		Clonmel Consumrs			
		Drogheda			
19,000	10	*Dublin Consumers*	5 0 0	7 0 0	6 0 0
		Dublin Hibernian (see United Gen.)			
160	25	Dundalk	25 0 0		22 0 0
		Dungannon			
1000	5	*Downpatrick*	5 0 0		
		Enniskillen			
		Galway			
400	10	Kilkenny	10 0 0	8 0 0	11 5 0
		Limerick (see U.G.)			
1725	5	Limerick Consum.	5 0 0	5 0 0	5 0 0
600	15	Londonderry	15 0 0	6 13 4	21 10 0
500	7	Lisburn	7 0 0	6 5 0	7 0 0
520	10	Lurgan	6 0 0	6 0 0	6 0 0
		Mallow			
		Monaghan			
		Nenagh			
448	5	Newtownards	5 0 0	4 0 0	5 0 0
		New Ross			
		Newry			
		Omagh			
125	20	Portadown	20 0 0	5 0 0	20 0 0
600	10	Sligo	10 0 0		
		Tipperary			
		Tralee			
		Waterford			
		Wexford			

The Gas Works in the undermentioned towns belong to private individuals:—

Bridgenorth.	Farsley.	Holt.	Morpeth.	Sheerness.	Ware. (2 works)
Carlow, old.	Gainsborough.	Huntingdon.	Oswestry.	Sidmouth.	Wem.
Carnarvon.	Goole.	Hyde (Cheshire)	Peterborough.	Sittingbourne.	Weymouth.
Deal.	Harleston	Kingston-on-Thames.	St. Alban's.	Spalding.	Whitchurch (Salop).
Diss.	Hertford.	Lynn.	Sandwich.	Waltham Abbey.	Wisbeach.
Ely.					

The Gas Works belong to the Corporations, or to Commissioners acting under special acts of Parliament, in the following towns:—

Carlisle.	Keighly.	Milton (Kent).	Rothesay.	Southport (Lanc.)	Walsall.
Cashel.	Knaresborough.	Paisley.	Richmond (Yorkshire).	Stockport	Wells (Norfolk).
Coleraine.	Lytham (Lanc.)	Rochdale.	Salford.	Strabane.	Youghall.
Greenock.	Manchester.				

Price Current.

The following List of Prices is corrected by an eminent wholesale house in each trade up to the latest period:—

CASTINGS, per Ton.

Average Weight of Cast Iron Pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow	Newcastle.	Wales.	Yorksh., Derbysh., and Staffrdsh
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1.	3 7 6	2 10 0	3 0 0	3 15 0	3 10 0
1¼ and 2 inches Socket Pipes	6 0 0	5 0 0	5 10 0	5 15 0	5 15 0
2½ and 3 do. do.	5 17 6	4 17 6	5 7 6	5 12 6	5 12 6
4 and 5 do. do.	5 15 0	4 15 0	5 5 0	5 10 0	5 10 0
6 inches and upwards do.	5 12 6	4 15 0	5 2 6	5 7 6	5 7 6
Extra for bends, branches, and connection	2 0 0	2 0 0	2 0 0	2 0 0	2 0 0
Retorts, 1st fusion	5 5 0	..	..	4 17 6	5 0 0
Do. 2nd fusion	5 15 0	4 10 0	4 17 6	5 5 0	5 5 0
Tank Plates, ⅜ thick and above	5 10 0	4 17 6	5 0 0	5 7 6	5 17 6
Do. less than ⅜	5 15 0	5 0 0	5 0 0	..	5 10 0
Plain Castings ex. models	5 15 0	5 0 0	5 0 0	5 10 0	5 10 0

COALS.

NEWCASTLE. Unscreened.	s. d.	
Tyne Main	5 6	per ton.
Ravensworth Pelaw	5 9	„
Dean's Primrose		
Pelton		
Brancepeth	6 0	„
Medomsley		
New Tanfield		
Pelaw	6 3	„
Eighton Moor		
Felling Main		
New Pelton		
Peareth	6 6	„
South Pelaw		
Waldridge		
South Peareth		
Ramsay's Cannel	12 0	„

DERBYSHIRE. Unscreened.	s. d.	
Clay Cross	6 6	per ton.
Deep Main		
New Birchwood		
New Shipley		
Sleight's		

SCOTCH CANNEL.		
Kirkness best	23 0	„
Lothian	18 0	„
Lesmahago at Glasgow	16 6	„
Ditto at Leith	18 0	„
Wemyss	15 0	„
Dombristle	12 0	„
Lethans		
Bridgeness	11 0	„
Kinneil		
Lochgelly	10 0	„
Lumphinan		

FIRE GOODS.

Best Fire Bricks, 50s. per thousand, at Newcastle.
Do. Clay, 12s. per ton do.

WROUGHT IRON TUBING, subject to 40 per cent. Discount.

	2 inches.	1½ inch.	1¼ inch.	1 inch.	¾ inch.	½ inch.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent welded tubes, from 4 to 12 feet, per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto „ 2 to 4 feet	One penny per foot extra.					
Ditto „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting pieces, or long screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, springs, and elbows, wrought iron	3 9	2 3	1 9	1 6	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron cocks	17 6	10 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing sockets, caps, plugs, and nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain sockets	1 0	0 8	0 7	0 5	0 4	0 3
Flanches	1 9	1 6	1 3	1 0	0 9	
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	

FREIGHTS, per Ton.

Coastwise—Newcastle.	s. d.
Chatham & Roches.	6 0
Cork	8 6
Dover	6 6
Dublin	9 0
Exeter Quay	9 0
Folkestone	7 3
Hastings	7 6
Ipswich	6 0
Jersey	9 0
London	6 6
Lowestoft	6 0
Lynn	6 6
Margate	6 6
Portsmouth	8 0
Plymouth	8 0
Southampton	8 3
Weymouth	8 3
Yarmouth	6 0
Foreign.	
Amsterdam	10 0
Boulogne	7 6
Barcelona	20 0
Bordeaux	11 0
Calais	7 6
Dieppe	8 6
Hamburg	9 9
Havre	9 0
Lisbon	12 0
Rotterdam	9 0
Rouen	11 6
St. Petersburgh	
Stettin	
Trieste and Venice	23 0

WESTERN GAS LIGHT COMPANY.

REPORT

OF EXPERIMENTS COMPARING THE ILLUMINATING POWERS OF THE WESTERN AND CHARTERED GASES.

To the Directors of the Western Gas Light Company.

GENTLEMEN,

Agreeably to your instructions "*to examine and report upon the relative economy of the Cannel Gas supplied by your Company to the public, and that made from Common Coal by the Chartered Gas Company,*" I have to inform you that the Examination was conducted on the evening of the 24th instant, in the presence of

J. WOOLLAMS, Esq.,
T. TRITTON, Esq.,
J. ROSE, Esq.,
F. SASSE, Esq., } *Commissioners for Paving and Lighting the Parish of St. James, Westminster.*

F. W. RUSSELL, Esq.,
F. EDWARDS, Esq.,
T. W. POWELL, Esq.,
J. S. ORTON, Esq., } *Directors* } *of the Western Gas Company.*

G. H. PALMER, Esq., *Engineer*
S. BARBER, Esq., *Secretary* } *of the Western Gas Company.*

Also, by invitation of the Paving Board,

GEORGE LOWE, Esq., *Consulting Engineer to the Chartered Gas Company.*
FREDERICK J. EVANS, Esq., *Superintendent of their Westminster Station.*

The Experiments were made in a room at No. 8, Ranelagh-street, Pimlico, the walls and ceiling of which were coated with lamp black—a necessary precaution, to prevent as much as possible the interference of reflected light. The Gas of each Company was introduced direct from their respective mains, and measured by experimental meters, the accuracy of which was ascertained in the presence of the Commissioners, Mr. Lowe exercising his choice of the particular meter to be used for each Gas. The amount of Light given by each flame was estimated by Bunsen's Screen, or Photometer. These arrangements were agreed to by all present, as fair and satisfactory.

It is well known to those acquainted with Coal Gas, that *to burn equal quantities* of Gas of different qualities in the same time, and to estimate their relative economy by the *amount of light* rendered by each, gives a considerable advantage to the richer Gas. This advantage I advised should be given up by the Western Company, and proposed to estimate the relative economy of the Gases by the quantity of each required to give *equal lights*; the same kind of Burners being used for each, but the apertures being proportionally smaller for the rich than for the poor Gas. This arrangement tended to simplify the experiments, inasmuch as it was only necessary to put the screen equidistant from each light, and by regulating the two lights until they indicated equal intensity, the economy was shown in the simple inverse proportion of the quantities consumed in the same length of time—the lesser consumption divided upon the greater, giving the per centage of superiority.

EXPERIMENTS BEFORE THE COMMISSIONERS, &c., AT RANELAGH STREET.

1st EXPERIMENT.

With equal Lights.

The burners consuming { CHARTERED—STREET BATSWING . 4·12 / WESTERN—SMALL BATSWING . . . 1·77 } cubic feet per hour.

RESULT.—Superior illuminating power of the *Western Gas*, 132 per Cent.

2nd EXPERIMENT.

With equal Lights.

The burners consuming { CHARTERED—STREET BATSWING . 4·22 / WESTERN—SMALL FISHTAIL . . . 1·95 } cubic feet per hour.

RESULT.—Superiority of *Western Gas*, 117 per cent.

3rd EXPERIMENT.*

With equal Lights, Argand Burners to each Gas.

Not carried out, Mr. Lowe objecting to the height of the Chimney Glasses.

4th EXPERIMENT.

Compound Experiment—Unequal Lights—with LESLIE'S BURNER to each Gas.

Intensity of Light { CHARTERED . . . . . 100 / WESTERN 118

Consumption . . { CHARTERED . . . . . 4·12 / WESTERN . . . . . 2·47 } cubic feet per hour.

RESULT.—Superiority of *Western Gas*, 96 per cent.

5th EXPERIMENT.

With equal Lights.

The burners consuming { CHARTERED—LARGE FISHTAIL . 5·27 / WESTERN—SMALLER FISHTAIL . 2·46 } cubic feet per hour.

RESULT.—Superiority of *Western Gas*, 114 per cent.

6th EXPERIMENT.*

With equal Lights, Argand Burner to each Gas.

The burners consuming { CHARTERED . . . . . 6·17 / WESTERN . . . . . 3·42 } cubic feet per hour.

RESULT.—Superiority of *Western Gas*, 80 per cent.

The difference of per centage between the Argand and Flat flames is such as might have been anticipated from the difficulty in procuring Argand Burners, each fitted for the most economical combustion of the different Gases.

These experiments show that the illuminating power of your Gas is, on the average of burners generally used, more than double that of the Chartered Company's Gas, or, in other words, 1000 feet of yours gives as much light as 2000 feet of theirs.

As a suggestion explanatory of the results obtained by Mr. LESLIE, which are so contrary to those I now furnish you with, I may remark that, by the kindness of that gentleman, I witnessed a repetition of his experiments; and, while I am convinced of the utmost candour and fairness on his part, it appears to me that the want of attention to a few apparently trifling precautions may account for the great difference observable between us. Indeed, these precautions being partially attended to on the occasion when I was present, did most materially alter the results of his experiments upon repetition by himself, as you will see by the following statement:—

MR. LESLIE'S EXPERIMENTS,

Repeated at his Offices on the 22nd instant.

1st EXPERIMENT.†

CHARTERED GAS. STREET BATSWING.
WESTERN GAS. SMALL FISHTAIL.

RESULT.—Superiority of illuminating power of *Western Gas*, 127 per cent.

2nd EXPERIMENT.

CHARTERED. STREET BATSWING,
WESTERN. LESLIE'S BURNER.

RESULT.—Superiority of *Western Gas*, 127 per cent.

3rd EXPERIMENT.

CHARTERED. LESLIE'S BURNER.
WESTERN. LESLIE'S BURNER.

RESULT.—Superiority of *Western Gas*, 117 per cent.

4th EXPERIMENT.†

SAME AS THE FIRST, BUT WITH SMALLER CONSUMPTION OF GAS.

RESULT.—Superiority of *Western Gas*, 59 per cent.

5th EXPERIMENT.

CHARTERED. STREET BATSWING.
WESTERN. LARGER FISHTAIL.

RESULT.—Superiority of *Western Gas*, 132 per cent.

In Mr. Leslie's first experiments (on the 24th of June), reported to you by the commissioners, the gas of the Chartered Company was received direct from the mains, while the Western Gas was carried in a gas holder, containing fresh water, which, no doubt, deteriorated the gas.

The lights from the respective gases were not equal in intensity, but least on the part of the richer gas in all the experiments, except that in which Mr. Leslie's own burner was used. This accounts for the less amount of comparative advantage of the Western over the Chartered Gas, in experiments, Nos. 1 and 4, marked † of the *repeated* experiments. In both of these cases the burners used for the Western Gas were of too small a size, and consuming too little gas, to contrast fairly with those used for the Chartered.

Care was evidently not taken to dispel the Chartered Gas, or the air, which the meter contained, at the commencement of the experiments. One cubic foot, at least of the Western Gas, should have been passed rapidly through the meter for this purpose.

I have the honour to be, Gentlemen, your most obedient servant,

London, July 30, 1850. ALEXANDER WRIGHT, Gas Engineer.

* Experiment No. 3, it will be seen, was objected to by MR. LOWE, and consequently abandoned; but at the request of the Commissioners, and for their satisfaction, it was tried at a later period, and appears as No. 6 Experiment. This, notwithstanding the opinion expressed by the objector, turned out the most favourable of any for the Company which he represented.